REPORT RESUMES

ED 020 420 VT 005 426

HEALTH MANPOWER RESEARCH. VOLUME 1.
BY- BUTTER, IRENE AND OTHERS
MICHIGAN UNIV., ANN ARBOR, BUR. OF HOSP. ADMIN.
PUB DATE JUN 67
EDRS PRICE MF-$0.75 HC-$7.52 186P.

DESCRIPTORS- *HEALTH OCCUPATIONS, *HEALTH PERSONNEL, *RESEARCH, *RESEARCH NEEDS, SEMINARS, RESEARCH SKILLS, RESEARCH METHODS, HOSPITALS, MEDICAL SERVICES, RESEARCH PROPOSALS, WORKSHOPS, RESEARCHERS, DIRECTORIES, INFORMATION SOURCES, EDUCATIONAL NEEDS, EDUCATIONAL PROGRAMS, LITERATURE REVIEWS, ANNOTATED BIBLIOGRAPHIES, OPERATIONS RESEARCH, ECONOMIC RESEARCH, SOCIOLOGY, MANPOWER DEVELOPMENT, MANPOWER UTILIZATION,

THE TWO PARTS OF THE DOCUMENT REFLECT THE ACTIVITIES CARRIED OUT TO FULFILL THE PRIMARY PURPOSES OF A PUBLIC HEALTH SERVICE CONTRACT (1) TO STIMULATE FURTHER ACADEMICALLY BASED HEALTH MANPOWER RESEARCH, AND (2) TO EXAMINE THE FIELD IN ORDER TO RECOMMEND PRIORITY AREAS OF HEALTH MANPOWER RESEARCH. PART A INCLUDES--(1) REFERENCE TO A SURVEY PAPER WHICH DISCUSSES HEALTH MANPOWER IN TERMS OF ECONOMIC CONCEPTS, (2) A REPORT OF TEACHING ACTIVITIES OF PROJECT MEMBERS, INCLUDING A RESEARCH SEMINAR IN HOSPITAL AND MEDICAL CARE SYSTEMS AND A COURSE IN THE ECONOMICS OF HEALTH, AND (3) PROPOSALS FOR STUDYING THE COST OF MEDICAL EDUCATION, RATES OF RETURN TO PHYSICIANS, AND THE INTERNATIONAL MIGRATION OF PHYSICIANS, AND A PROPOSAL FOR A WORKSHOP DEALING WITH THE SUPPLY AND GEOGRAPHICAL DISTRIBUTION OF HEALTH MANPOWER, THE COST OF RESTRICTIVE PRACTICES AND THE EVALUATION OF HEALTH MANPOWER LEGISLATION. PART B INCLUDES--(1) THE RESULTS OF A SERIES OF SURVEYS DESCRIBING THE STATUS OF GRADUATE TRAINING FOR HEALTH MANPOWER RESEARCH, (2) A DISCUSSION OF THE FEASIBILITY OF DEVELOPING A TRAINING PROGRAM FOR HEALTH MANPOWER RESEARCH AND THE ALTERNATIVE APPROACH OF ENCOURAGING SCHOLARS IN THE VARIOUS DISCIPLINES TO DO RESEARCH IN THE HEALTH MANPOWER AREA, (3) AN ANNOTATED BIBLIOGRAPHY OF RESEARCH PROJECTS IN HEALTH MANPOWER AND RELATED AREAS, (4) A LISTING OF INDIVIDUALS ENGAGED IN HEALTH MANPOWER RESEARCH, (5) A TENTATIVE LIST OF COMMUNICATION MEDIA USEFUL TO HEALTH RESEARCHERS, AND (6) AN ANNOTATED BIBLIOGRAPHY OF STUDIES WHICH MAKE USE OF OPERATIONS RESEARCH TECHNIQUES CLASSIFIED AS DESCRIPTIVE MODELS, PRESCRIPTIVE MODELS, MEASUREMENT STUDIES, AND DISCUSSION PAPERS. "HEALTH MANPOWER RESEARCH, VOLUME 2" (VT 005 427) INCLUDES THE PROJECT BIBLIOGRAPHY AND APPENDIXES. (JK)

BUREAU

OF HOSPITAL

ADMINISTRATION

SCHOOL OF PUBLIC HEALTH
THE UNIVERSITY OF MICHIGAN ANN ARBOR

ED0 20420

HEALTH MANPOWER RESEARCH

Volume I

FINAL REPORT ON

PUBLIC HEALTH SERVICE CONTRACT

PH 108-66-201(P)

VT005426

IN COOPERATION WITH THE SCHOOL OF BUSINESS ADMINISTRATION, MEDICAL SCHOOL, UNIVERSITY HOSPITAL

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

HEALTH MANPOWER RESEARCH

Final Report on Public Health Service
Contract No. PH 108-66-201

June 1967

Irene Butter, Ph.D.
Paul J. Feldstein, Ph.D.
Richard C. Jelinek, Ph.D.
Patience C. Beer
Ann Morton

Bureau of Hospital Administration
School of Public Health
University of Michigan

PROJECT STAFF

Co-Directors

Paul J. Feldstein, Ph.D.
Richard C. Jelinek, Ph.D.

Principal Investigator

Irene H. Butter, Ph.D.

Full Time Research Assistants

Patience C. Beer
Ann Morton

Special Research Assistant - Ph. D. Candidate

Samuel Levy

Part Time Research Assistants

Lawrence Clement
Malca Clement
Angela Clements
John Hubbard
David Maglott
Isabel Sim

Part Time Secretaries

Milla Cummins
Susan Groeneweg

Suzanne Babinski
Ida Gorter
Mary Honold
Mary Uranga

TABLE OF CONTENTS

Volume One
- Title Page
- List of Project Staff
- Table of Contents

Introduction 1

Part A
- Section One - *Health Manpower Survey Paper* 11
- Section Two - *Teaching Activities Promoting Health Manpower Research* 12
- Section Three - *Research Proposals* 31

Part B
- Section One - *Status of Graduate Training for Health Manpower Research* 1
- Section Two - *Development of a Training Program for Health Manpower Research* 31
- Section Three - *Report on Research Projects Being Conducted in Health Manpower and Related Areas* 37
- Section Four - *Registry of Persons Active in Health Manpower Research* 62
- Section Five - *Media of Communication: Sources of Information for Health Manpower Researchers* 104
- Section Six - *Bibliography of Significant Operations Research Studies in Health Manpower* 108

Volume Two
- Section Seven - *Bibliography of Literature Related to Health Manpower* 1
- Appendix A - *Catalogue of Pertinent Text Materials*
- Appendix B - *Masters' of Hospital Administration Thesis Topics*
- Appendix C - *Medical Care Administration Program Materials*
- Appendix D - *OMPER Programs*
- Appendix E - *University Manpower Research Centers*
- Appendix F - *Materials from Manpower Courses*

INTRODUCTION

This report is based on research conducted in connection with a one year contract with The Bureau of Health Manpower of the Public Health Service and is submitted in accordance with the requirements of that contract. The materials in this report reflect the activities which have been carried out to fulfill the intent of the contract.

As an increasing amount of governmental attention is focused on the health field and as more funds are provided for the development of health manpower, it has become extremely important that sound information be available to the policy-makers on the true nature of the health manpower problems they are seeking to remedy.

The primary purposes of this contract have been to stimulate academically based research and to examine the field in order to recommend the areas of health manpower research which should be given priority in study. In order to achieve these objectives, funds were provided for the establishment within the Bureau of Hospital Administration of a staff composed of people with backgrounds in operations research and economics who would do work of a preliminary nature towards becoming a center for continuing research in health manpower. The summary of the report which follows describes the activities which have been carried out during the year 1966-1967 towards this end.

SUMMARY

This report is divided into two sections, Parts A and B. In Part A are materials reflecting the original work done for the purpose of stimulating further research, while Part B consists mostly of materials and reports prepared in surveying the current state of health manpower research.

Part A
Section One

Section One of Part A is a survey paper (separately attached to this report) in which health manpower is defined and discussed in terms of economic concepts. In examining the requirements for and the availability of health manpower, the relative role of various factors in determining the supply and demand for health manpower are discussed. In regard to demand, these include the determinants of demand for health services, the role of manpower in the production function for health services, the degree of substitutibility and complementarity between different categories of health personnel and the effects of technological change.

Such factors as recruitment, capacity of educational programs and length of training, restrictive practices, the retention of manpower, remuneration, qualification patterns, continuing education, immigration and supply elasticities are examined as determinants of the supply of health manpower. The other aspects of the availability of health manpower which the paper says must be considered are the distribution of health manpower and the factors determining this, such as geographical distribution of training programs and the effect of licensure on mobility, and the utilization of health manpower. There are many questions to be studied in this last area, such as problems of underutilization and the relationship between training programs and tasks of subsequent jobs, to name just two.

A fourth area where further work is needed is described as that of health manpower planning and legislation. This planning encompasses not only projections of future supplies and demands, but should also be devoted to study of the institutions by which planning may be implemented and the long-time educational requirements of health manpower. As legislation becomes an increasing force in determining health manpower policy, the need for evaluation and planning in this context will increase. Some present areas of concern with regard to legislation discussed are the relative effectiveness of the same mechanism, such as educational subsidies, on different occupations, the relative effectiveness of salary increases, lower tuition, and greater availability of grants and loans for different occupations, and the accomplishments of health manpower legislation as compared with the expected results of policies aimed at increasing the demand for health services of the low income population.

Besides the development in the survey paper of a framework for research in health manpower, the first part of the report includes an account of the teaching activities of the project members, copies of proposals for future research projects, and a proposal for a workshop for health manpower researchers.

Part A
Section Two

In this section are described the teaching activities carried out by Richard Jelinek, Paul Feldstein, and Irene Butter for the purpose of promoting the study of health manpower problems with the analytic tools provided by operations research and economics. Professors Jelinek and Feldstein were responsible for a research seminar in Hospital and Medical Care Systems and Professor Feldstein gave a course in The Economics of Health, both at the graduate level. The three chief project members also lectured on manpower topics in other courses given in the School of Public Health.

Part A
Section Three

Proposals for three research studies and for a workshop on health manpower are presented in this section. The three research projects are A Cost Study of Medical Education, a study of Rates of Return to Physicians, and An Economic Analysis of The International Brain Drain of Physicians: 1956-1966.

The objectives of the cost study on medical education are to develop estimates on the total unit cost of physician training including undergraduate medical education, internship training, residency training, and possibly post-residency training, and to determine the extent to which variability in unit costs of undergraduate medical education is associated with differences in medical student enrollment and the extent to which other factors influence variability in unit costs. If data can be compiled for a number of years, it would be possible to examine the effect of enrollment size on per student cost both in terms of unit cost over time for the same medical school with changing enrollment and as a comparison of unit costs in a stratified sample of medical colleges at the same point in time. It is anticipated that developing a cost function of medical education would be useful in resolving questions such as "What is the total cost of training a physician in comparison to the training costs of other highly skilled resources?" and "What is the return on investment in physician education relative to the return on investing in alternative types of education?".

The study of rates of return to physicians would incorporate results from the cost study on medical education. This study, which would comprise both private and social rates of return to physicians, has as its objectives to develop estimates of costs and returns of medical education; to compute private and social internal rates of return by state or size of census district, by type of practice, and if possible by specialty; to examine change in the rates of return over time; to rank the rates of return to medical education by type of practice, specialty, and geographical area; to compare these rates of return with those of comparable professional groups; and to assess the existence, extent, and the effects of restrictive practices in medicine on the rate of return to physicians. Possible applications of the study results and possible data sources are also presented.

The third proposed study on the international migration of physicians, which has already been funded for a three year period, is designed to provide more knowledge of the international physician brain drain and its changing magnitude since 1956. With estimates of the economic value of the net losses or net gains of physicians to different countries, an attempt will be made to examine the welfare implications of physician migration. The relative importance of economic and non-economic determinants of physician migration will be assessed for each country. Existing U.S. immigration policy and educational assistance programs for foreign medical graduates will be evaluated in the context of the brain drain phenomenon.

Another original contribution of the project, is a proposal for a workshop on health manpower. The proposal which,as of this point, has not been funded is presented in this section of the report. The objective of the workshop is to produce studies which will develop and employ an analytic framework for health manpower studies contributing to the definition of policy goals, to the rationality of policy measures, and to the subsequent evaluation of policy achievements. The subjects which have been suggested are The Supply and Geographical Distribution of Health Manpower, The Cost of Restrictive Practices and Their Effect on Supply and Utilization of Health Manpower, and Evaluations of Health Manpower Legislation. It is intended that the papers written for the workshop be published.

Part B
Section One

One task required by the terms of the contract, was an investigation of the current status of education for potential health manpower researchers. The results of a series of surveys seeking to describe this training are presented in this section. No formal training programs for health manpower researchers were found and, consequently, the investigation was concerned with determining what training is available in the more general area of manpower research. Study of hospital administration and medical care administration programs has shown that the health field provides little training which would equip researchers to do meaningful analytic work on health manpower problems. A selective study of courses on manpower or health operations research offered in university departments of economics, sociology, and industrial engineering, however, has shown that there is considerable attention given to manpower problems, and even health manpower problems, in economics and sociology departments and that health systems are becoming an area of increasing interest in a few university operations research courses.

In this discussion of training for potential health manpower researchers, the seven manpower research centers established by OMPER and several other major university manpower research centers are discussed because these centers draw graduate students into manpower research and also provide informal, if not formal, research training.

A brief discussion of financial support for the training of manpower researchers is also included in this section. Three sources of support which are mentioned as having been effective in drawing graduate students into the manpower or health manpower research are the fellowships awarded by The Kellogg Foundation, the dissertation support given to operations research students at Johns Hopkins University, and the dissertation grants awarded by OMPER to students writing on manpower topics.

The appendices attached to Part B contain materials relevant to the discussion of research training. Appendix A contains reading lists from courses which provide training in analytic manpower research. These lists are included as a catalogue of the most pertinent text materials currently in use. Appendices B and C contain materials from hospital administration and medical care administration programs, intended to support the contention that, while there is some concern with health manpower research in these programs, it is limited. Appendix D is composed of reports and brochures on the activities of the OMPER manpower centers, while Appendix E contains similar information about several other university research centers doing relevant manpower research. Appendix F contains correspondence and course outline pertaining to the survey of economics, sociology, and operations research courses.

Part B
Section Two

The idea that special graduate training leading to a degree in health manpower research be established is discussed in terms of the development of other new areas of study and of the particular nature of health manpower as a subject for research. Based on the considerations that health manpower is not an academic discipline with a body of unique theoretical knowledge and unique methodologies, and that the costs of training people specifically for this new area of research would probably be higher than the costs of attracting equally competent researchers from fields such as economics, or operations research, the establishment of a special health manpower training program is opposed. Rather, emphasis is placed on the provision of funds to attract good scholars to the field.

Part B
Section Three

Section Three is a report on recent health manpower research projects. The projects have been listed alphabetically by project director in lists classified by sponsoring agency and project location. The information on which these lists are based has been compiled from many sources, including government grants publications, Abstracts of Hospital Management Studies, and The Health Information Foundation's Inventory of Social and Economic Research in Health. Following the health manpower research projects are general manpower projects relevant to health manpower. It is noted that the report is necessarily incomplete since there is no central information source on research projects of this type and that undoubtedly many of the references have become outdated.

Part B
Section Four

This section continues the survey work of Section Three by listing people actively engaged in health manpower research. Names have been taken from the list of research projects and from our bibliography of health manpower studies. The names have been arranged, as an aid to other researchers, both by area of interest and by location. Naturally this registry can not be completely comprehensive, but an attempt has been made to be as thorough as possible.

Part B
Section Five

The media of communication in fields related to health manpower are important sources of information for health manpower researchers. These media include journals, abstracts and bibliographies, professional and research organizations regularly issuing pertinent literature, and conferences. A tentative list of the media of communication used in this project is included here for the readers' interest.

Part B
Section Six

This section consists of an annotated bibliography of studies on aspects of health manpower which make use of the techniques of operations research and which make a significant contribution to the field of health manpower research. The papers are classified as descriptive models, prescriptive models, measurement studies, or discussion papers.

Part B
Section Seven

The final section of the report is a bibliography, arranged by subject, of the studies used in the course of the project. Besides studies dealing directly with health manpower, relevant studies dealing with other aspects of health services or with economic or operations research methodology are included since it is felt that the researcher must work within the context of the entire health care field.

Many of the items required by the contract to be submitted in the final report have been arranged in an order differing from the contract, and so the following Key is given for the aid of anyone interested.

Key to Location of Required Materials in Final Report

As Listed in Contract	Required Materials and Reports	Location in Final Report
B2a	Report on the status of and prospects for Graduate Education in health operations research and health manpower research and management	Part B Section One
B2b i, ii, iii, iv, v	A training plan for such education	Part B Section Two
B2b vi	Report on needed developments in health services operations research and health manpower research methodology	Review paper accompanying final report
B2b vii	Report on present college and university sponsored health manpower research and health services operations research activity	Part B Section Three
B2b viii	Registry of persons active in this field, with area of interest and institutional affiliation indicated	Part B Section Four
B2b ix	An annotated bibliography of pertinent literature	Part B Section Six
B2b x	Two copies of each item listed in the bibliography	Separately packaged and accompanying final report
B2b xi	A catalogue or index of pertinent instructional materials	Part B Appendix A

As was stated before, the work done in this project has been of a preliminary nature. Continuing from this point, the staff developed under this contract plans to carry out further research in the area of health manpower. Besides the physician brain drain study designed as part of this project, a series of studies on supply, distribution, and rates of return as well as evaluations of health manpower legislation are anticipated.

Part A - Section I

Health Manpower

Survey Paper

(Attached Separately to Report)

SECTION TWO

TEACHING ACTIVITIES PROMOTING HEALTH MANPOWER RESEARCH

An important part of the developmental activities carried out under this contract constitutes teaching activities of the principal staff. Through a variety of courses Professors Feldstein and Jelinek and Dr. Butter have promoted the development of effective theory and methodology in health manpower research. Those teaching activities which are most pertinent are described below. While these courses have been offered by the Bureau of Hospital Administration, they have not been restricted to students in the hospital administration program. Rather, they have attracted students from the areas of public health, economics, industrial engineering, and statistics, as well as faculty members from many areas of social science.

Perhaps the most significant effort in this regard is the Research Seminar in Hospital and Medical Care Systems which Richard Jelinek and Paul Feldstein first organized in 1964. As the focus of this seminar has developed in the past few years, it has become increasingly concerned with problems relevant to health manpower research.

The purpose of the weekly seminar, open to qualified graduate students and also attended by interested research associates, has been (a) to discuss and review current research in medical and hospital care conducted in the various academic disciplines, including economics, operations research, and behavioral science; (b) to serve as a doctoral workshop for research in this area; and (c) to provide a medium of communication concerning the research work in this area performed in the various units of the University of Michigan. The course format has been to present and review research studies conducted by the seminar participants, with theoretical concepts and relevant methodology being emphasized. In the past year, guest speakers from both within and outside the University have presented their current research.

Figure 1

THE RESEARCH SEMINAR IN HOSPITAL AND MEDICAL SYSTEMS

Richard E. Jelinek, Ph.D.
Paul J. Feldstein, Ph.D.

Purpose

(a) To discuss and review current research in medical and hospital care.

(b) To encourage graduate students to conduct research in this area.

(c) To provide a medium for communication concerning the research work in this area performed in the various units of the University.

A. Subject Areas

The provision of medical care may be viewed as a complex and highly integrated system consisting of a series of sub-systems, each of which involves a set of inputs for producing an output. The sub-systems to be studied may vary from the operation of the dietary department to the provision of medical care in general. In the latter case, the system uses each of the major components of care, e.g., hospital, physicians, as the inputs.

The research interests involve:

1. The specification and measurement of inputs and outputs and their relationship.
2. The optimization of a specific sub-system.
3. The inter-relationships between the various sub-systems.

Figure 1 (cont'd)

B. Methodological Aspects to be Covered

1. Evaluation of methodological techniques presently being used in the area of medical and hospital care, e.g., classical flow process techniques, multivariate analysis, and queueing theory.

2. Adaptions to this area of methodological techniques from other disciplines and not currently applied in this field, e.g., linear programming, simulation techniques, inventory models, and econometrics.

3. Refinement of existing techniques and the development of new techniques to be applied to this area.

C. Course Format

The organization of the seminar will be both flexible and informal. Outside speakers will be invited to discuss their own research, which will serve as a supplement to the seminar discussions. Each student taking the seminar for credit will be expected to prepare and present a research paper.

The seminar will meet once a week for a two and a half hour session and may carry either two or three hours of credit.

Enrollment for credit requires graduate standing and permission of the instructor.

D. Financial Assistance

Limited research development funds are available for research on a doctoral dissertation in the subject matter covered by the seminar.

Not only have the staff members been responsible for organizing the seminar and attracting participants, but they have also given presentations on their own research in the seminar. Professor Jelinek gave one seminar on "A National Econometric Model of the Supply and Demand for Nurses" and Dr. Butter gave seminars on both "The Cost of Medical Education" and "The International Migration of Physicians". These three, which were based on research in health manpower, were not the only presentations in this area. Indeed, considerable interest in health manpower is reflected in the subjects discussed. David Littmann, a graduate student in the Department of Economics, spoke on "The Supply, Demand, and Distribution of Dentists", Professor Roy Penchansky of the School of Public Health, spoke on "The Referral Consultation Process Among Physicians", and Ronald Perry, a doctoral student in the Department of Industrial Engineering spoke about a "Nursing Activity Model". Figure 2 presents more complete information about the speakers and their topics.

Figure 2

Speaker	Topic
Irene Butter Research Associate Bureau of Hospital Administration (Project Member)	"Cost of Medical Education" and "The International Migration of Physicians"
Prof. Rodney Fraser Department of Economics Queens University Kingston, Ontario	"Statistical Relationships between Health, Health Serivices, and National Prosperity"
Professor Basil Georgopoulos Department of Psychology and Survey Research Center University of Michigan	"Quality of Patient Care"
Professor Richard C. Jelinek Bureau of Hospital Administration (Project Member)	"A National Econometric Model of the Supply and Demand for Nurses"

Figure 2 (cont'd.)

David Littmann Graduate Student Department of Economics	"The Supply, Demand, and Distribution of Dentists"
Professor Roy Penchansky Department of Medical Care Organization School of Public Health	" Referral Consultation Process Among Physicians"
Ronald Perry Graduate Student Department of Industrial Engineering	" Nursing Activity Model"
Ronald Rubell Graduate Student Harvard Business School	"Decision Theory in Medical Diagnosis"
Hugh D. Walker Lecturer Department of Economics University of Indiana	"Price and Market Power in the Ethical Drug Industry"

Besides the research seminar, the members of this project have been involved in various other teaching activities during the year. In these cases also, they have taken the opportunity to stimulate work in the area of health manpower and to encourage the development of research methodologies useful in these studies.

Professor Jelinek has lectured this past semester in two courses offered in the Hospital Administration Program. In H.A. 501 (Hospital Organization and Management) he delivered a series of lectures on Management Control in Hospitals. These included lectures on the hospital as a system, scheduling, and staffing. Supplementary readings, designed to give hospital administration students an appreciation of operations research methods and their applications to the hospital system, included two of his papers on staffing and scheduling as well as papers by John Young and Karl Bartscht. (See Figure 3). In H.A. 502 (Hospital Research) Professor Jelinek taught a section on Research

Figure 3

HA 501

Hospital Organization and Management

Reading List I

Winter - 1967

Jan. 9.	John R. Griffith, *Quantitative Management in Hospitals*, Chapters I and II.
Jan. 11	Richard C. Jelinek, *Methods for Scheduling*.
Jan. 13	Karl G. Bartscht, *Man-Minute Computations Form the Basis for New Staffing Methodology*, *Time Analyzed for Alternative Food Flow Systems*, *Range of Required Skills Detailed in Study of the Pharmacy Function*, *Linen Production Methods Analyzed in the Laundry*. (Copies to be distributed.)
	Skim over: *Demonstration and Evaluation of Hospital Staffing Methods*: *Radiology Methodology Manual*, and *Housekeeping Methodology Manual* (Project Report Number 12-A and 12-B).
Jan. 16	John P. Young, *A Method for Allocation of Nursing Personnel to Meet Inpatient Care Needs*.
	Richard C. Jelinek, "A New Approach to the Analysis of Nursing Activities," *Hospitals*, October 1, 1966.

in the Utilization of Nursing Personnel. This course, which is required of all the hospital administration students, has as its objectives to expose the students to research in various disciplines pertinent to hospitals and the health care field, to develop an appreciation for the scientific method in research, and to develop an ability to evaluate research. Here again, the emphasis was on health manpower topics. Doctor Jelinek conducted one seminar on the CASH Nursing Program, which includes studies on a staff utilization control program, a quality control plan for the nursing service, nursing time requirements for patients of various age groups, and labor costs. Other seminars focussed on Charles L. Kennedy's " A Study of the Effect of the Organization of Nursing Hours on Direct Patient Care and Productive Activity on a Nursing Unit ", and the University of Iowa study, "An Investigation of the Relation Between Nursing Activity and Patient Welfare". (See Figures 4, 5, and 6)

Paul Feldstein and Irene Butter also taught sections of the course on Hospital Research. Dr. Feldstein's topic was Research in the Economics of Health Care while Dr. Butter spoke on Research in Health Manpower. While Dr. Jelinek presented an operations research approach to health manpower studies, Dr. Feldstein and Dr. Butter each presented an economic approach, concentrating on such issues as the application of rates of return analysis to health manpower, the effect of restrictive practices on health manpower, and economic analysis of the supply of nurses. (See Figure 7)

In addition to teaching part of H.A. 502, Dr. Feldstein gave a graduate level course on the Economics of Health. This course stressed the application of economic analysis to the medical care field and attempted to provide the students with the theoretical framework necessary for such analysis, as the following paragraph states.

To summarize briefly, economic analysis can be useful to the study

Figure 4

HA 502 Hospital Research

Schedule of Classes

Winter - 1967

Date and Day	Subject	Lecturer
Jan. 6	Introduction to the Course	Mr. Lawrence Hill
Jan. 13 20 27	Research in Health Manpower	Dr. Irene Butter
Feb. 3 10 17	Research in the Utilization of Nursing Personnel	Dr. Richard Jelinek
Feb. 24	(HA 501)	
Mar. 10 17 24	Research in Hospital Organization and Structure	Dr. Luther Christma
Mar. 31 Apr. 7	Research in the Economics of Health Care	Dr. Paul Feldstein
Apr. 14	Discussion of Thesis	Mr. Lawrence Hill

All Classes meet from 2-4 p.m. on Fridays.

Figure 5

HA 502 Hospital Research

The objectives of this series of presentations are:

1. To expose the students to research in various disciplines which are pertinent to hospitals and the health care field.

2. To develop an appreciation for the scientific method in research.

   a. Defining the area or problem to be studied
   b. Developing hypotheses
   c. Designing methodologies
   d. Obtaining data
   e. Analysing data
   f. Drawing conclusions

3. To develop an ability to evaluate research.

   a. What is the purpose of the research?
   b. What methodology is used?
   c. What alternative methodologies might have been used?
   d. What limitations are inherent in the research?
   e. What sources and types of data are used?
   f. What alternative sources and types of data might have been used?
   g. Do the findings support the conclusions?
   h. What further work is suggested by the research?

Figure 6

HA 502

Hospital Research

Reading List II

Winter - 1967

Research in the Utilization of Nursing Personnel - Dr. Richard Jelinek

Feb. 3 F	CASH Nursing Program	a) Nursing Service: Staff Utilization Control Program b) Quality Control Plan for Nursing Service c) A Study of Nursing Time Requirements for Patients of Various Age Groups - Appendix I d) Pilot Labor Cost Study - Appendix II e) Pilot Labor Cost Study - Appendix III
Feb. 10 F	Charles L. Kennedy	"A Study of the Effect of the Organization of Nursing Hours on Direct Patient Care and Productive Activity on a Nursing Unit." (Master's thesis)
Feb. 17 F	Aydelotte, et al.	"An Investigation of the Relation Between Nursing Activity and Patient Welfare." Nursing Utilization Project Staff, State University of Iowa, 1960.

> of medical care in two ways: First, a knowledge of the tools of economics will enable one to *explain* what has been occurring and what is likely to occur in the future. The ability to predict and anticipate changes that will occur in medical care and in the provision of care are important to health care administrators. Secondly, economic concepts are an aid in achieving an *optimum* use of medical care resources. A decision-maker, whether he is a hospital administrator, the executive director of a hospital planning association, or anyone working in medical care who is concerned with the use of resources and can change the combination in which these resources are used, should have an understanding of maximum efficiency, minimum cost, etc., in order to produce a given level of care (of a given quality) at minimum cost or, similarly, how to produce a maximum amount of patient care for a given budget. The use of the economist's tools could be helpful in deciding how the provision of care is to be organized.
>
> Hopefully, by the end of this course, you will have a better understanding of what economic analysis is, how an economist thinks, and how he approaches a problem. Secondly, this course should teach you how to use these concepts for decision-making in the medical care field, for if you were able only to identify the economic concepts without being able to translate these concepts into application in medical care, you would not have gained anything from this course.*

Among the specific subjects covered were the demand and supply of medical care, the supply of nurses and physician services, the problem of "shortages", and the structure and performance of the medical care market with analyses of the physician industry, hospital industry, and health insurance industry. (See Figure 8)

In the future the three project members will certainly continue their teaching activities and as they continue to study health manpower problems, they will continue to concentrate on these topics. Because of the increasing interest of graduate students and because of their own involvement with health manpower research, Drs. Feldstein, Jelinek, and Butter are giving thought to the development of a separate research course devoted to topics in health manpower. Such a course would probably stress theoretical concepts in both operations research and economics, looking upon health manpower as one critical input in the medical care system.

---

*Paul J. Feldstein, "The Tools and Concepts of the Economist Useful for the Study of Medical Care", December 1966 (unpublished), pp.2,3.

Figure 7

HA 502

Hospital Research

Reading List I

Winter - 1967

Research in Health Manpower - Dr. Irene Butter

Jan. 13 F Rates of Return Analysis Applied to Health Manpower

1.	W. Lee Hansen	"Total and Private Rates of Return to Investment in Schooling" The Journal of Political Economy April 1963, pp. 128-140
2.	W. Lee Hansen	"'Shortages' and Investment in Health Manpower" The University of Michigan, Ann Arbor, Michigan, 1964, pp. 75-91
3.	W. Lee Hansen	"The Economics of Scientific and Engineering Manpower" Journal of Human Resources Spring 1967, pp. 191-220
4.	Elton Rayack	"The Supply of Physicians' Services" Industrial and Labor Relations Review, January 1964, pp. 221-237
5.	Kenneth J. Arrow & William J. Capron	"Dynamic Shortages and Price Rises: The Engineer - Scientist Case" Quarterly Journal of Economics May 1955, pp. 292-308

Jan. 20 F Effect of Restrictive Practices on Health Manpower

1.	Arlene S. Holen	"Effects of Professional Licensing Arrangements on Interstate Mobility and Resource Allocation" Journal of Political Economy, October 1965, pp. 492-498
2.	Milton Friedman	"Occupational Licensure," Capitalism and Freedom, Chapter 9, Chicago, 1962
3.	Simon Rottenberg	"The Economics of Occupational Licensing" Aspects of Labor Economics, National Bureau of Economic Research, 1963

Figure 7 (cont'd)

Jan. 27 F	Economic Analysis of the Supply of Nurses		
	1.	Donald E. Yett	"Supply of Nurses: Economist's View" *Hospital Progress*, February 1965 pp. 88-103
	2.	Donald E. Yett	"The Nursing Shortage and the Nurse Training Act of 1964" *Industrial and Labor Relations Review*, January 1966, pp. 190-200
	3.	Donald E. Yett	"The Causes and Consequences of Salary Differentials in Nursing" presented at the Western Economic Association Meeting, August 26, 1966

Figure 8

P. J. Feldstein
Winter 1967

ECONOMICS OF HEALTH
H.A. 505

Tentative Reading List

I. Introduction

Richard Leftwich, The Price System and Resource Allocation, Revised Edition, Holt,Rhinehart and Winston, New York (hereafter referred to as Leftwich), Chapters I and II.

Paul J. Feldstein, "The Tools and Concepts of the Economist Useful for the Study of Medical Care" (mimeo) December 1966.

II. The Magnitude of the Medical Care Sector

*Ida C. Merriam, "Social Welfare Expenditures," Social Security Bulletin, October, 1965.

*"The Nation's Hospitals: A Statistical Profile", (pp. 427-36), Hospitals, J.A.H.A., August 1, 1966, Part Two.

*Paul J. Feldstein, "Hospital Indicators: A Month by Month View of the Hospital Field," Hospitals, J.A.H.A., April 1, 1964, (pp. 17-24).

III, The Product of the Medical Care Industry

"The Medical Care Price Index", (Chapter 3), Report of the Commission of Cost of Medical Care, American Medical Association, Vol. I, 1964.

Ann Scitovsky, "An Index on the Cost of Medical Care - A Proposed New Approach", The Economics of Health and Medical Care, School of Public Health, The University of Michigan, 1964.

IV. The Demand for Medical Care

A. Background

Leftwich, Chapters III, IV, and VI.

Mordecai Ezekiel and Karl A. Fox, Methods of Correlation and Regression Analysis, John Wiley and Sons, New York, 1959, Chapters 3 and 5.

B. Estimates of Factors Affecting Demand

*Medical Care, Health Status, and Family Income, National Center for Health Statistics, Series 10, Number 9.

*Paul J. Feldstein, "The Demand for Medical Care", Report of the Commission on the Cost of Medical Care, Vol. 1, American Medical Association, 1964.

Gerald Rosenthal, The Demand for General Hospital Facilities, Monograph No. 14, American Hospital Association.

C. Review of Research on Demand for Medical Care

Paul J. Feldstein, "Research on the Demand for Health Services," Milbank Memorial Fund Quarterly, Part II, July 1966.

D. Demand for Health Insurance

Duncan M. McIntyre, Voluntary Health Insurance and Rate Making, Cornell University Press, 1962 (pp. 18-36).

*D.S. Lees and R.G. Rice, "Uncertainty and the Welfare Economics of Medical Care: Comment", and the reply by K. Arrow, American Economic Review, March, 1965 (pp. 140-158).

J.J. German, "A Note on the Economic Theory of Insurance with Some Implications for Health Insurance", (mimeo)

E. Suggested Additional Readings

*Herbert Klarman, The Economics of Health, Columbia University Press, 1965, Chapter II and III.

V. The Supply of Medical Care

A. Background

Leftwich, Chapters VII and VIII

H. Klarman, Op. Cit., Chapters 4 and 5

B. Hospital Cost Curves

Paul J. Feldstein, An Empirical Investigation of the Marginal Cost of Hospital Services, Graduate Program in Hospital Administration, University of Chicago, 1961 (pp. 1-57* and 60-64).

W. John Carr and P.J. Feldstein, "The Relationship of Cost to Hospital Size" (mimeo) February, 1966, (pp. 61-66).

Millard F. Long, "Efficient Use of Hospitals", Economics of Health and Medical Care, op. cit.

Millard F. Long and P.J. Feldstein, "The Economics of Hospital Systems: Peak Loads and Regional Coordination", Proceedings, American Economic Review, May, 1967.

C. The Supply of Nurses

Donald Yett, "The Supply of Nurses: An Economist's View", Hospital Progress, February 1965.

Donald Yett, "The Nursing Shortage and The Nurse Training Act of 1964", Industrial and Labor Relations Review, January 1966.

D. The Supply of Physician Services

W. Lee Hansen, "Shortages and Investment in Health Manpower", Economics of Health and Medical Care, op. cit.

VI. Price and Output Determination in the Medical Care Market

A. Background

Leftwich, Chapters IX, X, XI*, XII*, XIII, and XIV*.

B. The Problem of "Shortages"

Kenneth J. Arrow and William M. Capron, "Dynamic Shortages and Price Rises: The Engineer-Scientist Case", Quarterly Journal of of Economics, May, 1959.

Jacob P. Meerman, "Some Comments on the Predicted Future Shortage of Physicians", Journal of the American Medical Association, September 16, 1961

Milton Friedman, "Occupational Licensure", Capitalism and Freedom, University of Chicago Press, 1962.

C. Prices and the Allocation of Resources

Burton Weisbrod, "Some Problems of Pricing and Resource Allocation in a Non-Profit Industry - The Hospitals," Journal of Business, January, 1965, Vol. 38, No. 1.

Paul J. Feldstein, "A Note on the Pricing of Hospital Services", in An Empirical Investigation of the Marginal Cost of Hospital Services, op. cit. (pp. 65-74).

D. Selected Discussion Topics (Readings to be assigned)

1. Estimating Manpower Requirements

2. Area-wide Planning

VII. The Medical Care Market - Its Structure and Performance

A. Background

Leftwich, Chapters XV, XVI and XVII.

Kenneth Arrow, "Uncertainty and the Welfare Economics of Medical Care", American Economic Review, December, 1963.

Dennis Lees, Health Through Choice, Hobart Paper #14, Institute of Economic Affairs, London, 1961

B. Industry Analyses
(Additional Readings to be assigned.)

1. Physicians:

Reuben Kessel, "Price Discrimination in Medicine", Journal of Law and Economics, October, 1958.

Arlene S. Holen, "Effects of Professional Licensing Arrangements on Interstate Labor Mobility and Resource Allocation", Journal of Political Economy, October, 1965 (pp. 492-498)

Gaston Rimlinger and Henry Steele, "An Economic Interpretation of the Spatial Distribution of Physicians in the U.S.", Southern Economic Journal, July, 1963.

2. Hospitals:

Robert Rice "Analysis of the Hospital as an Economic Organism", Modern Hospital, April 1966, (pp. 87-91

Ralph Berry, "Competition and Efficiency in the Market for Hospital Services; the Structure of the American Hospital Industry", Unpublished dissertation, Harvard University (mimeo), 1965 (pp. 113-146)

3. Health Insurance:

Duncan McIntyre, "Pricing Health Insurance", Economics of Health and Medical Care, Op. cit.

Antonio W. Diokno, "Experience Rating and Community Rating", Hospital and Medical Economics, Hospital Research and Educational Trust, Chicago, 1962 (pp. 1067-1070), Vol. II.

Duncan McIntyre, Voluntary Health Insurance and Rate Making, Op.cit. (pp. 243-293).

4. Drugs:

Henry Steele, "Monopoly and Competition in the Ethical Drugs Market", Journal of Law and Economics, October, 1962.

VIII. A. Health as an Investment

Selma Mushkin, "Health as an Investment", Journal of Political Economy, Supplement, October, 1962.

Burton Weisbrod, The Economics of Public Health, University of Pennsylvania Press, 1961 (pp. 1-27).

Rashi Fein, "Health Programs and Economic Development", The Economics of Health and Medical Care, op. cit.

and the comment following the article by Richard Goode (pp. 282-285).

*Robin Barlow, "The Economic Effects of Malaria Eradication", Proceedings, American Economic Review, May, 1967.

*John and Sylvia Jewkes, Value for Money in Medicine, Oxford Blackwell, 1963 (61 pp.)

*The Change in Mortality Trend in the United States, National Center for Health Statistics, Series 3, Number 1.

B. The Role of Government in the Provision of Health Care

1. Public Demand for Medical Care

Richard Musgrave, The Theory of Public Finance, McGraw Hill, New York 1959, (pp. 6-22, 42-49, 136-140).

*Howard R. Bowen, Toward Social Economy, Rhinehart and Co., New York, 1948 (pp. 165-171, 172-198 and 212-220).

2. Financing Private Demand for Medical Care

Jerome Rothenberg, "Welfare Implications of Alternative Methods of Financing Medical Care", American Economic Review, Papers and Proceedings, May, 1951.

Jacob Meerman and Millard Long, "Aid for the Medically Indigent", Vanderbilt Law Review, December, 1962

Milton Friedman, "Social Welfare Measures", Capitalism and Freedom op. cit.

SECTION THREE

RESEARCH PROPOSALS

Three proposals for research studies and one proposal for a research workshop were developed as part of the activities intended to stimulate further research in health manpower. Copies of the three study proposals - A Cost Study of Medical Education; Rates of Return to Physicians; and The International Brain Drain of Physicians: 1956-1966 - are included here along with the workshop proposal.

Also included in this section is a short article written by Irene Butter, Richard Jelinek, and Lawrence Hill, Director of The Bureau of Hospital Administration, on the need for developing an analytical framework for research on health manpower shortages.

RESEARCH PROPOSAL FOR A COST STUDY OF MEDICAL EDUCATION

Concern about present and future shortages of physicians has recently channeled resources toward expanding the nation's training capacity, and has drawn attention to the pattern, the costs, and the financing of medical education.

The American Association of Medical Colleges has directed its cost studies primarily at program costs over time, particularly at the sources of income and distribution of expenditures over time. However, it appears that analyses of unit costs relative to the size of medical school enrollments and relative to other characteristics of medical education are equally important. When physicians are regarded as the output of an educational program unit cost analysis may aid selection between alternative ways of producing the future supply of physicians. Estimates of total, per student costs of medical education are useful when the following types of questions are to be resolved:

1) What is the total cost of training a physician in comparison to the training costs of other highly skilled human resources?

2) How is the total per student cost of medical education shared between student and society, relative to the sharing of costs of other types of education?

3) What is the return on investment in physician education relative to the return on investing in alternative types of education. Regarding the investment yield of physician training both private and social returns should be considered?

4) How do government subsidies to medical education compare with government subsidies to other types of education?

5) What major factors account for variability in the unit cost of medical education between schools and over time?

Furthermore, the relationship between unit cost and the size of the student groups taught in medical schools is important when decisions must be made regarding enrollment increases in existing medical schools vs.

construction of new medical schools, and regarding a combination of both measures.

OBJECTIVES OF COST STUDY

It is hoped that the planned study will accomplish the following two main objectives:

1) Development of estimates on total unit cost of physician training including a) undergraduate medical education, b) internship training, c) residency training, and possibly d) post-residency training.

2) Determination of the extent to which variability in unit costs of undergraduate medical education is associated with differences in medical student enrollment and the extent to which other factors influence variability in unit costs.

DATA REQUIREMENTS

To accomplish the above objectives will require the following types of data from a sample of medical schools:

1) Cost of supplies, equipment, administrative services, library and indirect or overhead expenses. (Available from A. II. a,b,c, of Annual Medical School Questionnaire)

2) Number of and total salaries of full time equivalent medical faculty, including imputed salaries for volunteer faculty. (This amount is not separately stated in the Annual Medical School Questionnaire, but is included in various items on the Questionnaire)

3) Net square footage of utilized physical facilities for undergraduate medical education and average quality or age of physical facilities of medical colleges and teaching hospitals (Not compiled on Annual Medical School Questionnaire).

4) Cost of basic and clinical research conducted at medical colleges (itemized under A. I. c,d,e,f,g,h,i and A. II. f on questionnaire.)

5) Cost of teaching, research, and service programs of the medical college in teaching hospitals and clinics, if not included in the previous categories. (These costs are provided under A. II. d of the Questionnaire items 1-7, but it would be desirable if these amounts could be broken down by type of cost, i.e. faculty salary, supplies, facilities costs etc.) It would also be helpful if items A. I. a and b (EXPENDITURES FOR FEDERAL AND NON-GOVERNMENT CONTRACTS OR GRANTS RESTRICTED FOR TEACHING AND TRAINING) could be broken down by type of expenditures, i.e. faculty salaries, student stipends etc.

6) Number, size and duration of fellowships available to medical students in each school. (Not stated on Annual Medical School Questionnaire).

The planned study could be carried out on the basis of data provided under item A. III. of the Annual Medical School Questionnaire - Total Medical College Costs Plus Sponsored Programs But Excluding Teaching Hospital and Clinic Costs combined with data on the size of the undergraduate medical student body of each school. However, considerably more can be learned about variability of costs from an analysis of unit costs of undergraduate medical training with respect to such variables as: a) enrollment of M.D. candidates, b) size of medical faculty, and level of faculty salaries, c) extent of research activity, d) type of clinical program, e) type and age of facilities, f) qualitative ranking of medical schools (if an index is available), g) geographical location, and h) public vs. private control of medical school.

At the same time it is essential to gather data on a) the extent to which undergraduate medical education is subsidized by the government and the form of these subsidies, and b) on the cost of internship and residency training per student. Estimates of the total cost of training a physician must include the dollar value of resources utilized for each stage of his training as well as the indirect opportunity costs, such as foregone income of students during the entire training period.

The findings of the study will be more reliable if data can be compiled for a number of years rather than just for one point in time. Thus it would be possible to examine the effect of enrollment size on per student cost in two different ways: a) unit cost over time, for the same medical college with changing enrollment, and b) a comparison of unit costs in a stratified sample of medical colleges, at the same point in time, allowing for other factors which might distort the relationship in question.

RESEARCH PROPOSAL FOR A HEALTH MANPOWER STUDY

Dr. Irene Butter, Research Associate
Bureau of Hospital Administration
University of Michigan

RATES OF RETURN TO PHYSICIANS:

LIFETIME EARNINGS INCREMENTS RELATIVE TO TRAINING COSTS

I. INTRODUCTION

The efficiency with which society allocates its investment funds between additions to the stock of one type of human skill relative to others represents a framework for analysis of manpower supply in the professions. With the use of evidence provided by rate of return estimates one can attempt to throw light on the efficiency in the allocation of human talent. Thus the rate of return method can be employed to focus on those market forces which govern the supply of highly skilled individuals and their distribution among professions.

The rate of return or investment-in-education approach differs from other analyses of professional personnel in that it defines a manpower excess or shortage in a relative sense. More specifically, internal rates of return indicate the relative value of adding to the stock of human capital in one profession, as compared to others, suggesting that a relative shortage exists in a profession with a higher rate of return than that of comparable professions. Using this approach a relative shortage is symptomatic of underinvestment in training of a specific type of human resource, but it need not imply an excess demand over supply of the human resource in question.

II. THE RATE OF RETURN ANALYSIS APPLIED TO PHYSICIANS

In applying the rate of return approach to examine the supply and distribution of physicians one views expenditures on medical education as an investment in the earning power of the trainee and one proceeds to calculate the investment yield of medical training. One way of calculating the investment yield is by determining the 'internal' rate of return, i.e. the rate which equates the present value of additional lifetime earnings of a physician with the total cost of training the physician. Standard procedure in this calculation includes estimation of average total training costs (inclusive of income foregone by the medical student while in training) as well as estimation of average lifetime net earnings differentials associated with medical education.

There are two variants to the internal rate of return, namely the private and the social rate. The private rate is relevant to decisions of students, when students pay a substantial part of the cost of additional education and when further education represents an investment in their future earnings potential. The social rate of return may be employed as a criterion for society's investment in human capabilities assuming that education-related earnings increments reflect the contribution of education to total national wellbeing. From the social rate of return one can draw inferences about the adequacy of society's total investment in education as well as about the distribution of investment funds between types and levels of education and training. The private and social rate of return differ in that the former is based on costs to the student and after-tax incomes while the social rate is derived from total social costs and before-tax income increments.

The study proposed here will comprise both private and social rates of return to physicians, by location, type of practice, and if feasible by specialty. The study addresses itself to the following questions:

1) Should the supply of physicians be altered as an alternative to training more or fewer qualified individuals for other health or non-health occupations.

2) If the supply of physicians is to be increased because rates of return suggest a relative shortage, in what regions and in what specialties is the shortage most acute.

3) Supposing that the rate of return to physicians in the aggregate is found to be in equilibrium, but at the same time relative shortages and excesses are detected in specific regions and/or specialties, what is the nature of the existing maldistribution.

Rates of return to physicians will be calculated on the basis of the following information:

A. Social rates of return:

1) average total costs to society of medical school, internship, and residency training.

2) opportunity costs, i.e. average earnings foregone by medical students during the entire period of their training, plus non-duty scholarship and fellowship stipends.

3) the net difference between before-tax lifetime earnings of physicians and other professionals who terminate their formal education upon graduation from college.

B. Private rates of return:

1) average total costs to the student of medical school, internship, and residency training.

2) opportunity costs, i.e. average earnings foregone by medical students during the entire period of their training minus scholarship and fellowship stipends.

3) the net difference between after-tax lifetime earnings of phy-

> sicians and other professionals who terminate their formal education upon graduation from college.

Social and private rates of return to physicians will be compared to social and private rates of return to dentists, Ph.D.'s in biological sciences and possibly to other professional groups. On basis of such comparisons one may infer whether the supply of physicians is scarce relative to the supply of other professionals. Social and private rates of return will also be calculated for separate groups within the medical profession, and comparison of the different sub-sets of rates of return will indicate relative shortages or excesses of physicians in specific geographical locations and specialties. Comparison of the social and private rate of return to physicians is also of interest, because it reveals whether the average physician's tax contribution to the government over his lifetime is greater than or short of society's financial contribution to the physician's education.

In general, the rates of return will indicate the extent to which extra earnings of physicians outweigh the costs involved in becoming a physician, and how the earnings yield on medical education investment compares to that of other professions. Since the financing of medical education by students has in recent years become an issue of public policy, this inquiry may also throw light on whether and to what extent subsidization of medical students is called for, whether such subsidies are likely to recruit larger numbers or better quality students into medical schools, and whether subsidies to medical students should perhaps be restricted to students going into certain specialties or to potential practitioners for specific geographical areas.

III. RELATED RESEARCH

Discussions on the supply of physicians and application of the rate of return approach have appeared in the literature and are represented in the following writings:

1. Ray Walsh, "Capital Concept Applied to Man", Quarterly Journal of Economics, February, 1935
2. Milton Friedman and Simon Kuznets, Income from Independent Professional Practice, 1946
3. Lee Hansen, "'Shortages" and Investment in Health Manpower" Proceedings of the Conference on The Economics of Health and Medical Care, University of Michigan, 1964
4. Elton Rayack, "The Supply of Physicians' Services", Industrial and Labor Relations Review, January 1964

IV. OBJECTIVES

1. To develop estimates of costs and returns of medical education.
2. To compute private and social internal rates of return by state or census district, by type of practice, and if possible by specialty.
3. To examine change in the rates of return over time, provided the necessary data can be obtained for years in the past.
4. To rank the rates of return to medical education by type of practice, specialty, and by geographical area, and to rank these rates of return with respect to rates of return computed by others, for comparable professional groups and for different levels of education.
5. To assess the existence, extent, and the effects of restrictive practices in medicine on the rate of return to physicians.
6. To develop a cost function of medical education, and to determine the role of economies of scale.

V. DATA SOURCES

A. The Cost Data:

Data on program costs of medical schools in the United States have been compiled for some years by the American Association of Medical Colleges. We hope to be able to obtain data on separate cost components of medical training programs and on student enrollments so as to develop estimates on total, per student costs of medical education based on the following:

1) instructional costs consisting of faculty salaries, supplies, equipment, and clerical services
2) a portion of research costs
3) costs of physical facilities
4) administrative costs
5) library costs
6) internship and residency training costs
7) opportunity costs

For the estimates of private rates of return it will be necessary to compile data on medical school tuition and other costs payed by medical students. For estimates of opportunity costs earnings data for terminal bachelor degree holders will have to be compiled and adjusted by the earnings of medical students while in training.

B. Data on Physicians' Earnings

Data on earnings of physicians are published by the Internal Revenue Service in Statistics of Income: U.S. Business Tax Returns and in various publications of the Bureau of the Census. Since 1961 the tax return data on physicians are published for some states, every second year. The Internal Revenue Service publishes earnings from self-employment for each year with respect to gross and net income, income distribution of physicians, and type of practice: i.e. single proprietors, partnerships, and corporations. Income data on physicians provided by the decennial census may be obtainable by census district and possibly by age. If necessary, a third source of income data on physicians may be used, namely the earnings surveys conducted by the magazine MEDICAL ECONOMICS. These surveys provide data on physicians' earnings by age, specialty, type of practice, and region. However, since the Medical Economics surveys have the limitation of unknown biases and low response rates, alternative sources of data will be used available.

RESEARCH BUDGET

Length of Project: Two to Three years

I. Personnel:

A.	Principal Investigator	(1/2 time for 2 1/2 years)	$ 18,000
B.	Research Assistant	(1 full time for 2 1/2 years)	15,000
		(1 half time for 2 1/2 years)	7,500
C.	Secretary	(1/2 time for 2 1/2 years)	6,000
D.	Staff benefits	12% of $ 46,500	5,580

II. Materials and Supplies

A.	Research Materials (IBM cards etc.)	150
B.	Office Supplies	300

III. Services

A.	Computer: programming, data processing and statistical analysis (approximately 3 hours at $ 300)	900
B.	Technical and Graphic services for report	150
C.	Duplication of Report and Xeroxing	200

IV. Travel

A.	Travel related to data gathering (approximately 6 trips)	1,200
B.	2 trips to Professional Meetings	500

Total Direct Cost:	$ 55,480

Plus Overhead

The International Brain Drain of Physicians: 1956-1966 - An Economic Analysis

1. Project Plan

a. Description of Project

Purpose - The proposed study is designed to provide more knowledge and increased understanding of the international physician brain drain and to the extent that data permit of its changing magnitude between 1956 and 1966. With estimates of the economic value of the net losses or net gains of physicians to each country, an attempt will be made to examine the welfare implications of physician migration. The relative importance of economic and non-economic determinants of physician migration will be assessed for each country. Existing U. S. immigration policy and educational assistance programs for foreign medical graduates will be evaluated in the context of the brain drain phenomenon.

Type - The primary project purpose is to do research of an empirical nature.

b. Justification of Project - Migration of highly skilled human resources across national boundaries has recently become recognized as a world-wide phenomenon. Because a larger number of countries are confronted with emigration of unprecedented numbers of professionals, the brain drain has become a subject of considerable debate and controversy. Some discussions have focused on the outflow of scarce talent and skills in general and on its possible implications for any country's welfare. Others have considered the issue in the light of disparities between developing and developed countries. And still others have denied the existence of a brain drain problem by arguing that only under conditions of unrestricted mobility of human capital can an optimal distribution of the world's talent pool be approximated. Granting the existence of varied viewpoints and frames of reference, if either implementation or modification of policy programs is in order, the underlying facts and causal determinants of the brain drain process must be established.

Despite the recent publicity and mounting concern about the international brain drain, as is evidenced by Senator Mondale's Speeches in the Senate (August and September, 1966), by a Department of State Conference and Workshop (summer, 1966), and by a growing frequency of articles appearing in the U.S. as well as in other countries, surprisingly little research on the brain drain has thus far been undertaken. A number of publications on the subject consist mostly of speculation and judgment without much supporting evidence. The few completed empirical studies have either been very general or have concentrated on selected professional groups and on selected countries.* It is, therefore, not surprising to find unanimous agreement on one aspect of this highly controversial issue, namely on the need for empirical evidence and for analytic studies.

---

*Abel-Smith, Brian, "British Doctors at Home and Abroad," Occasional Papers on Social Administration, No. 8, 1964. (Footnote continued on bottom of next page).

The proposed study is concerned with only one component of the general brain drain, namely with physicians. Physicians constitute a special case of international migration for a number of reasons: a) the volume of international migration of physicians seems to be quite large relative to most other professions*; b) the number of foreign medical graduates entering the U. S. has increased notably between 1950 and 1965 (per cent of New Medical Licentiates who are foreign medical graduates, 5.1 per cent - 16.6 per cent; per cent of total Internships filled by foreign medical graduates, 10.3 per cent - 20.6 per cent; per cent of total Residencies filled by foreign medical graduates, 9.3 per cent - 28.8 per cent); c) the supply of physicians is critical for socio-economic development of poor countries; d) the U. S. is thought to be one of the richest countries with respect to quantity and quality of physician manpower while presumably receiving a larger influx of foreign physicians than most other countries; e) in contrast to outputs of scientists and other highly talented individuals, physicians' services can be beneficial to the native population only when physicians reside in their native country. The conditions stated above point to the need for an investigation which focuses exclusively on the brain drain of physicians.

Grubel, Herbert G., and Scott, Anthony, "The International Flow of Human Capital," *American Economic Review*, May, 1966, and "The Immigration of Scientists and Engineers to the United States, 1949-61, *Journal of Political Economy*, August, 1966.

Halpern, Burton, "New Exodus: Israel's Talent Drain," *The Nation*, Vol. 200, May 10 1965.

Hunt, Halsey, "The Brain Drain in Medicine," *Federation Bulletin*, April, 1966.

Mills, Thomas J., "Scientific Personnel and the Professions," *The Annals of the American Academy of Political and Social Science*, September, 1966.

Pan American Health Organization, *Migration of Health Personnel, Scientists, and Engineers from Latin America*, September, 1966.

West, Kelly M., "Training for Medical Research: The World Role of the United States," *The Journal of Medical Education*, March, 1964.

West, Kelly M., "Foreign Interns and Residents in the United States," *The Journal of Medical Education*, December, 1965.

*After Engineers and Teachers (not specified), physicians and surgeons constitute the largest group of professional immigrants to the United States between 1956-1965. Frank L. Mott, "The Immigrant Worker," *The Annals of the American Academy of Political and Social Science*, September, 1966, p. 30.

The planned study will include all of the world's countries* confronted with migrating physicians and will apply the tools and concepts of economics to an analysis of the brain drain process. It will describe the brain drain problem, its magnitude, and its specific nature in each country. It will examine various types of determinants of migration, and the importance of their role in each country. It will also attempt to assess the economic impact of physician migration on each affected country.

The framework for the planned study is developed from the following two points:

1) The term "brain drain" implies a loss, but the meaning of this loss has not been clearly identified in most discussions. This study will identify and analyze the economic aspects of the loss, its nature, scope, and the conditions under which losses may be incurred.

2) Diagnosis of the "brain drain" in any specific country must be made in net terms, and must be based on statistics of immigration and emigration, as migration of physicians tends to be multi- rather than uni-directional. A nation may be losing medical graduates to one or several countries, while at the same time it attracts foreign medical graduates from a group of other countries. The more varied the status of the medical profession in different countries and the more varied the motivating factors for migration, the greater is the likelihood that most countries are affected by two-way flows of migrating physicians.

The expected output of this study includes the conceptualization and quantification of relative economic losses and gains of both losing and receiving countries, a better understanding of the economic losses and gains resulting from physician migration, and some insights on remedial policy to compensate or mitigate the incurred losses. A further potential contribution of this study is that by means of the data and estimates which will be developed, it will facilitate subsequent analytic studies on such aspects as the substitutability of foreign and native physicians in different countries and the interrelationships of markets for physicians and markets for medical care between specific pairs or groups of countries. It is furthermore anticipated that in the course of carrying out the proposed study, new tools and concepts for analysis of physician migration will be developed.

---

*By means of a preliminary survey, it will be determined how many countries experience physician migration and for how many countries the required data can be obtained.

The Specific Aims of the Project:

a) Identification and measurement of the annual loss of physicians by each country and region of the world, 1956-1966.

b) Estimates of each country's balance of trade for physicians, 1956-1966.

c) Classification of countries and regions with respect to severity of the brain drain.

d) Identification and measurement of the net gain of physicians to the United States, 1956-1966.

e) Assessment of the economic value of physician loss of each country and of the economic value of total physician gain to the United States, 1956-1966.

f) Assessment of the relative importance of economic and non-economic determinants of migration of physicians for each country.

g) Outline of the pattern of international and intercontinental migration of physicians with respect to the net position of each country and region and using alternative groupings of countries.

c. Methodology - The procedures planned for the compilation and analysis of data will be described with respect to the specific aims, a-g, stated above.

a) The annual physician drain from each country and region of the world to the U. S. during 1956-1966 will be expressed in terms of each country's stock of physicians, rate of production of physicians and the effect on physician-population ratios of respective countries. The data are to be compiled from: World Directory of Medical Schools (several editions); and from The Second and the Third Report on the World Health Situation, The World Health Organization, 1963 and 1967; specific manpower studies of individual countries such as: Medical Manpower in Canada, by Stanislav Judek, 1964; Medical Manpower, Office of Health Economics, London, 1966; Abel-Smith, Brian, "British Doctors at Home and Abroad", Occasional Papers on Social Administration, No. 8, 1964; Migration of Health Personnel, Scientists, and Engineers from Latin America, Pan American Health Organization, Washington, 1966, and through correspondence with Health Ministries and Immigration Offices of individual countries.

b) The efflux of each country's physicians will be adjusted by the influx of physicians from other countries to establish the balance of trade for physicians. The required data will be obtained from immigration offices and possibly from the medical association of each country.

c) On the basis of estimates for a) and b), a classification of countries with respect to severity of the brain drain can be developed. It will be interesting to observe the degree of stability of this classification between 1956 and 1966.

d) The net flow of physicians to the United States, 1956-1966, will be assessed with respect to a) the distribution of foreign medical graduates between interns, residents, practicing physicians and those in teaching and research positions, to the extent that data are available, and b) with respect to the geographical distribution of foreign physicians. Distinctions will be made between those who come for several years of post-graduate training and return to their native countries subsequently and those who immigrate. The necessary data may be compiled from the Immigration and Naturalization Service and from the Waiver Review Board of the U. S. Office of Education. Also, we hope to obtain data from the A.M.A. census of physicians, which presumably identifies the majority of licensed and unlicensed physicians residing in the U.S. Despite the great difficulty of ascertaining actual immigration rates, because some entering with visitors visas eventually immigrate and others entering with immigration visas stay only temporarily, the trends of influx can be determined approximately and will allow for inter-country comparisons.

e) The direct economic value of the loss of physicians by each country can be assessed in terms of: 1) a human resource investment loss, estimated in terms of the total social, per student cost of providing elementary, secondary, higher and/or medical education in each country. The total social per student cost will then be multiplied by the net loss of physicians to each country to arrive at the value of human capital embodied in emigrating physicians, and 2) data permitting, an alternative estimate of the economic loss can be made by computing the present value of future, lifetime earnings of emigrating physicians, had these physicians continued to practice medicine in their native country. For such estimates data on the age distribution of emigrating physicians, as well as data on the average age and pattern of retirement will be required in addition to cross sectional earnings data for physicians. Presumably one cannot ascribe an economic loss to a country for emigration of those physicians who return after completion of post-graduate training in the U.S. Indirect economic losses such as foregone economies of scale in the production of physicians' services and restricted scope for specialization are presently not measurable in view of conceptual difficulties and inadequacy of the data.

The direct impact of the influx of physicians into the U.S. may be assessed in the following ways:

1) Some have suggested that physician inflow to the United States from the rest of the world constitutes a subsidy roughly proportional to the expenditure of resources required to build and operate that number of additional medical schools which can produce domestic medical graduates equal in number to the annual influx of foreign medical graduates. While a measurement of this subsidy to the United

States would be of interest it would not adequately reflect the value of human medical capital accruing to the United States as a result of physician influx.

2) More meaningful from an economic viewpoint are computations of the human capital value of foreign physicians. Such estimates could be made in two alternative ways:

   a) in terms of the actual total educational costs incurred by the native countries in training their emigrating physicians, or

   b) in terms of resources that would have to be spent by the United States on investment in a comparable educational attainment of an equal number of medical graduates in America. A third approach entails computation of the present value of future lifetime earnings in the United States of immigrating physicians. The validity of all three of the estimates depends to a certain degree on the validity of assuming that immigrating physicians reside as practicing M.D.'s in the United States for the rest of their working lives.

Data on earnings of physicians by country and on the cost of all levels of education and the cost of medical education are required for each country. Data on physicians' earnings are available for developed countries such as Great Britain, Canada, and were compiled for Denmark, Norway, France, and Germany by Tibor Scitovsky, "An International Comparison of the Trend of Professional Earnings" in American Economic Review, March, 1966, pp. 25-42. Also, the International Social Security Association has compiled some data on physicians' earnings in Western European countries. Such data should also be obtainable for individual countries in Latin America and to a certain degree for less developed countries. Cost of education and cost of medical education data are available for Canada and Great Britain and presumably for other developed countries. These costs may have to be estimated from other data for less developed nations. Medical school tuition is listed for many countries in the World Directory of Medical Schools.

When all estimates of losses and gains have been converted into dollar values, the sum of all countries' losses to the U.S. may be compared to total gains of the United States.

The statistics on foreign medical graduates in the U.S. from 1956-1966 will also be employed to examine the differential absorption of foreign medical graduates by states in relation to the differences in supply and demand of physicians in respective states An interesting question relates to the relative magnitude of excess demand for physicians in different states and their relative hospitality to foreign physicians. This may be examined in terms of:

1. State differences in the percentage of new licentiates that are foreign-trained physicians, 1956-1966.

2. State differences in the percentage of internships and residencies filled by foreign medical graduates, 1956-1966.

3. State differences in failure rates of foreign medical graduates on licensure examinations, 1956-1966.

4. Correlation of total applicants for licensure as percentage of state's stock of physicians, with failure rates of foreign physicians, 1956-1966.

5. Correlation of per cent of foreign applicants for licensure passed with average state earnings of physicians, 1956-1966.

The A.M.A. publishes ample data on foreign physicians in its annual State Board (June) and Education (November) number. More data may be obtainable directly from the A.M.A. Average earnings of physicians by state may be obtainable from Medical Economics Surveys (conducted since 1928) or from the tax-return data compiled by the Internal Revenue Service.

f) Assessment of the relative importance of economic and non-economic forces as determinants of migration of physicians.

A comparison will be made between earnings of physicians in foreign countries with earnings of physicians, interns, and residents in the United States. Scitovsky found sources of physicians earnings data for a number of developed countries. For less developed countries the available data may be crude, but nevertheless will make possible approximate comparisons over time. We plan to write to each country's medical association for data on physicians' earnings. Other sources will also be explored for data on physicians' earnings.

It is hoped that for most countries we can obtain data on the range of physicians' earnings, so that the relative potential for professional advancement as well as average or median earnings may be compared. Relative earnings of physicians in different countries must be converted into after-tax, real incomes for the purpose of comparisons of economic status of the profession. Provided there are sufficient sources of required data on cost of medical training and physicians' lifetime earnings, rates of return or present values of lifetime earnings will be presented for comparison of the monetary value of physician training in different countries. Such estimates can also be developed to show relative rates of return on migration of physicians from different countries.

Positive earnings differentials or rate of return differentials between the U.S. and foreign countries provide inducement for immigration whereas the cost of moving and the cost of additional required training in the country of destination may act as an economic discouragement to emigrating physicians. The relative cost of moving from each country to the U.S. will be estimated and compared to the economic advantages.

The relative availability of positions for physicians and the location of these positions will also be examined for each country, if information is available.

If positive difference in the economic status of physicians in the U.S. relative to foreign physicians either do not exist or do not appear to be substantial, non-economic motivating factors must play a role in the brain drain process. Such factors as professional, academic, and political freedom, intellectual environment, availability of resources for professional work, working conditions, language barriers and similar variables will also be examined.

g) The interregional pattern of migration of physicians can be based on several different grouping schemes:

1) Countries between which there are strong immigration barriers versus contries between which immigration barriers are weak or non-existent, e.g.. British commonwealth nations.

2) Developing versus developed countries, classified as by Harbison and Myers*into I. Underdeveloped, II. Partially Developed, III. Semiadvanced, and IV. Advanced.

3) Quasi-geographical groupings:

   (a) English-speaking countries: U.S., Canada, Great Britain, Australia, New Zealand, and India, in addition to any other country which uses English as the prime language in the educational system.

   (b) Western Europe

   (c) Eastern Europe

   (d) Latin America

   (e) Near East

   (f) Asia

   (g) Africa

For each country and region, the flow picture of physicians to the U.S. may be expressed in forms of ratios which have immigrating physicians from country X over total number of immigrants from country X as the numerator, and have total number of physicians in country X over total population of country X (or total occupied population of country X) as denominator. If physicians as a

---

*Frederick Harbison and Charles A. Myers, Education, Manpower and Economic Growth. 1964.

percentage of total emigrants equal physicians as a percentage of the population or occupied population, the physician drain is in line with general emigration out of the country. Such ratios have been employed by Grubel in his studies on the brain drain.

To ascertain the pattern of international migration of physicians, one requires reliable data on immigrating physicians by country of birth and last residence and emigrating physicians by country of destination, both of these in the form of time series. Data are available on how many physicians from which foreign countries enter the U.S. annually. The sources of data for migration between foreign countries still have to be employed.

d. Available Facilities - The Bureau of Hospital Administration of The University of Michigan provides furnished office space to the principal investigator, research assistants and secretary, as well as an environment conducive to research in health economics. Several economists at the Bureau conduct research on the health care system on projects which also engage a number of graduate students in the economics department.

The Bureau of Hospital Administration is organized in the University as a unit of the School of Public Health. It also enjoys the direction of a "Major Advisory Committee" consisting of:

Dean, School of Public Health
Dean, Graduate School of Business Administration
Dean, School of Medicine
Director, University Hospital
Executive Vice President, the University
Director, Bureau of Hospital Administration (ex officio)

As a unit of the School of Public Health, Bureau activities are coordinated with those of other units of the School. Key among these is the Department of Medical Care Organization and Bureau of Public Health Economics. Because of the organizational structure, close cooperation between the Bureau and the Department of Medical Care Organization provides facilities for this research which are, we feel, second to none in the country. For example, the Bureau of Public Health Economics is currently studying the distribution of physicians in Michigan. Thus, there are a number of people involved in research in health manpower and they have free and easy communication concerning their work.

Aside from the School of Public Health, the Bureau of Hospital Administration has developed good working relationships with the Departments of Industrial Engineering and the School of Nursing (reflected in jointly appointed faculty) and with the Medical School.

One of the members of the major advisory council of the Bureau of Hospital Administration is W. N. Hubbard, M.D., Dean of the Medical School of The University of Michigan and President of the Association of American Medical Colleges. Regarding the conduct of its teaching and research activities, the Bureau of

Hospital Administration has, since its inception, maintained close connection with the Medical School. Therefore, the Bureau will have access to the Medical School for consultation, as needed, on the proposed study.

As University academic staff, research personnel on this project will have access to all library facilities at the University including the specialized collections of the Bureau of Hospital Administration and Public Health Economics. Computer services are available from the University's Computing Center and from the Department of Bio Statistics of the School of Public Health.

e. Previous Work by Applicant on This Project - Irene H. Butter, Ph.D., has been engaged in research and teaching economics of human resources during the past three years. She has completed a study on "Costs and Returns of Graduate Education in Four Disciplines" which was conducted with financial support from the U.S. Office of Education. The applicant has taught a course on 'Investment in Human Resources' at Flint College and a part of a course on 'Methodology of Health Manpower Research' at the University of Michigan.

2. Results Obtained by Others

Related studies on the migration of human capital include several previously mentioned publications by H.G. Grubel and A.D. Scott, none of which include results on physicians. These studies are relevant in that they represent attempts at dealing with conceptual and measurement problems which are general to economic analyses of migration.

An exploratory, worldwide survey of the migration of scientists, including physicians, was undertaken by Steven Dedyer at the University of Lund. Preliminary results were presented by him in "Migration of Scientists: A Worldwide Phenomenon and Problem" in Nature, March 7. 1964, but none of the early findings were specific to physicians.

Kelly M. West has published several studies on foreign interns, residents and research trainees, which contain a large amount of pertinent information. However, Dr. West's studies present statistics only on the influx of foreign physicians into the United States and no attempt is made to measure the losses and gains resulting from the flow of medical graduates, or to examine the welfare implications. Dr. Kelly M. West, "Foreign Trainees in the United States" in International Biomedical Research, First National Institutes of Health International Symposium, Bethesda, Maryland, October 31-November 2, 1963, "Training for Medical Research: The World Role of the United States" The Journal of Medical Education, March, 1964, "Foreign Interns and Residents in the United States" The Journal of Medical Education, December, 1965.

3. Biographical Sketches

Irene H. Butter, Research Associate at the Bureau of Hospital Administration, will be the principal investigator of the project. She holds an M.A. and Ph.D. degree in Economics, from Duke University. She is currently the project director of a general Health Manpower Project supported by the Public Health Service. The various activities carried out under this Health Manpower Project include: an assessment of training programs for manpower researchers in academic institutions, the compilation of a complete and up-to-date bibliography on health manpower research and a registry of health manpower researchers, the planning of a health manpower workshop, and the development of some proposals for future studies. During the last three years, the applicant has been engaged in research on investment in human resources. She has completed a study on "Cost and Returns of Graduate Education in Four Disciplines" which was conducted with financial support from the U.S. Office of Education. The applicant has taught economics at Duke University, at the Department of Economics of The University of Michigan, and at Flint College of The University of Michigan. Among other courses, the applicant has taught a course on economics of human resources. She was also a member of the research staff of the Board of Governors of the Federal Reserve System during the years 1959-1961

4. Personal Publications

"Financial Inputs of Graduate Education," Proceedings of the Association of Institutional Research, 1966 (to be published soon).

"Understanding the Health Manpower Shortage," by Irene Butter, Lawrence A. Hill, and Richard C. Jelinek, Employment Service Review, November, 1966.

Economics of Graduate Education: An Exploratory Study, Final Report, Cooperative Research Project No. 2852, U. S. Office of Education, November, 1966.

Lawrence A. Hill, Professor and Director, Program and Bureau of Hospital Administration, will be project director, holds an M.A. degree in History and an M.H.A. degree in Hospital Administration. He is also Vice President of the Association of University Programs in Hospital Administration. Since 1960 he has taught a variety of courses all related to the health system in the Program in Hospital Administration at the University of Michigan. He has also maintained an active interest in health research, as is evidenced by some of the following publications:

"Educating the Physician for Medical Staff Responsibilities," Hospitals, J.A.H.A., August, 1960.

Pratt, Oliver G., and Hill, Lawrence A., "The Price of Medical Education," Hospitals, J.A.H.A., August 1, 1960.

"The Cost of Medical Education in the Hospital: Are we Getting our Money's Worth?," Journal of the American Medical Association, May, 1962.

"The Cost of Graduate Medical Education," Proceedings of the Fourth Annual Conference on Medical Education, Graduate School of Medicine, University of Pennsylvania, December, 1962.

Grenholm, G. G., and B. C. Payne, and L. A. Hill, *The Cost of Medical Care, Volume 4 - Changing Patterns of Hospital Care*, American Medical Association, June, 1964.

Butter, Irene, Ph.D., Lawrence A. Hill and Richard C. Jelinek, Ph.D., "Understanding the Health Manpower Shortage," *Employment Service Review*, U. S. Department of Labor, (In press).

"The Continuing Education of Hospital Personnel," *Hospital Forum*, 8: 21+, March, 1966.

Workshop on Health Manpower: Theoretical and Empirical Analysis

INTRODUCTION

In recent years a large and growing volume of funds have been allotted to health manpower legislation, while an inadequate amount of effort has been devoted to specification of goals and to economic analysis regarding such legislation. In view of current and prospective health manpower problems it is likely that existing legislative programs will be expanded and that additional ones will be developed. Thus there is a need for analytic studies of health manpower, studies which will provide criteria for identification of potentially effective policies and also criteria for their evaluation.

PURPOSE

The purpose of this workshop is to produce some solid studies that will be of value to decision makers, and with these studies to make an impact on the reasoning and planning which underlies policy formation and execution. Specifically, the objective is to develop and employ an analytic framework for health manpower studies which will contribute to the definition of policy goals, to the rationality of policy measures, and to the subsequent evaluation of policy achievements.

PROGRAM

A workshop is to be held in Michigan in September of 1967, over a period of one and a half days. There will be three separate sessions centered around the following topics:

I. The Supply and Geographical Distribution of Health Manpower
II. The Cost of Restrictive Practices in their Effect on Supply and Utilization of Health Manpower
III. Health Manpower Legislation: Evaluations

It is hoped that one or two papers will be presented at each session, that there will be several discussants of papers at each session, and that the papers will serve as the focus of general discussion by all participants of the workshop.

Each author is encouraged to present an analytical framework for his topic, to specify the causal variables and to assess the relative weight of each of the variables. Ideally, authors will combine theoretical analysis with a certain amount of empirical analysis, and will clearly define the problems while also suggesting what alternative solutions are feasible.

The papers written for this workshop are to be published, possibly in a volume which will also include some already published studies on related topics.

SCHEDULE FOR WORKSHOP

Session I. Chairman:

The Supply and Distribution of Health Manpower

A. Introductory Paper: "A Production Function for Health: The Role of Health Manpower".

B. Analysis of the Supply and Geographical Distribution of Health Manpower

1. Physicians -
2. Dentists -
3. Nurses -
4. Allied Health Professions

Session II. Chairman:

The "Cost" of Restrictive Practices in Health Occupations

A. Effect on entry

B. Effect on utilization

Session III. Chairman:

Health Manpower Legislation

A. Evaluation of Policies directed toward Program (facilities, staff, and curriculum) vs. Student (traineeships, scholarships, loans) Support in terms of the effects on Quantity, Quality and Distribution of Health Manpower.

B. The Welfare Implications of Health Manpower Legislation -

The schedule for the workshop includes a cocktail party the evening prior to commencement of meetings, to enable participants to get acquainted, followed by 1½ days of meetings. It is hoped that the workshop can be held at a center, such as Walden Woods, where all participants can stay for the duration of the meetings.

REQUIRED FUNDS FOR WORKSHOP

1. Honoraria

A. For five original papers in Sessions IA, II, and III @ $1,500 each
Total: $7,500.

B. For empirical studies selecting persons already familiar with area, 4 persons @ $200 each
Total: $800

C. For Discussants, approximately 8 discussants @ $100 each
Total: $800

2. Travel Expenses:

   A. For 17 persons on program @ $200 per person
      Total: $3400
      Accomodation expenses for 2 days per person @$15 per day
      Total: $510

   B. Expenses for PJF, RCJ, and IB to spend time on workshop and travel to authors if necessary
      Total: $4000 + 45% or $900 for overhead = $4900

   C. Editorial Assistant, 25% time for 1 year
      Total: $2000

3. Supplies
   Total: $500

Grand Total: $20,410

Article Appearing in
Employment Service Review
November 1966, pp. 46, 47 and 49

UNIVERSITY OF MICHIGAN
Bureau of Hospital Administration
School of Public Health
University Hospital

In recent years, a great deal of attention has been focused on problems concerning health manpower, especially problems relating to the shortage of personnel in the health field. Many individuals and organizations have conducted studies and expressed opinions concerning the problems of shortages. Although the concensus is that there exist general shortages of professional people, including physicians and nurses, the studies and expressions are primarily subjective and lack sufficient objective validation and in-depth understanding of the problem. It is not surprising, then, that the opinions and conclusions concerning the nature of shortages are often found to be contradictory.

Two major problems concerning the present state of understanding health manpower shortages are (1) lack of common and explicit definitions of the terms used, especially the term "shortage" itself, and (2) lack of analysis of the system governing health manpower, particularly with respect to identification of causal factors and assessment of their relative impacts on the system.

Careful attention to definitions and adaptation of the tools of economic analysis and operations research to investigations of health manpower "shortages" could enhance current understanding of the problem considerably and provide an objective base both for diagnosis of the "shortages" and recommendations for remedial action.

Initial steps toward the structuring of an analytical framework for the manpower system have already been taken by such investigators as Lee Hansen

(1964) and Donald Yett (1965) in the health field, and by Blank and Stigler (1957) and Arrow and Capron (1959)[1] in the fields of science and engineering. These investigators have derived an analytical framework from the concepts of demand and supply, from identification of variables which produce changes in demand and supply, and from analysis of the adjustment process of market mechanisms by which, after an initial disturbance, equilibrium of demand and supply may be restored.

Given an analytical framework, as the above, the demand for health manpower can be examined with respect to (a) demand for health services, which is determined by factors such as income, size and age structure of the population; and (b) productivity of health manpower, which is determined by the state of technology and its adaptation, as well as the degree to which manpower is properly educated, trained, and utilized.

An examination of health manpower supply should include such factors as the total human resource potential of society, the fraction of the total manpower supply that can or should be attracted to any given profession, and the conditions or instruments that underlie recruitment and retention of manpower in a given profession.

A set of operational definitions for the concept of manpower shortage has emerged from the above analytical approaches to assessment of manpower shortages. However, a great deal remains to be done, and the communication gap between analysts and policy makers needs to be reduced.

---

[1] David M. Blank and George J. Stigler, *The Demand and Supply of Scientific Personnel*, New York, 1957; Kenneth J. Arrow and William M. Capron, "Dynamic Shortages and Price Rises: The Engineers-Scientist Case", *Quarterly Journal of Economics*, May 1959; W. Lee Hansen, "'Shortages' and Investment in Health Manpower", *The Economics of Health and Medical Care*, Ann Arbor, 1964; Donald E. Yett, "The Supply of Nurses: Economist's View", *Hospital Progress*, February 1965, and "The Nursing Shortage and the Nurse Training Act of 1964", *Industrial and Labor Relations Review*, January 1966.

It appears that the following distinctions are imperative for any meaningful discussion of manpower shortages in the health sector:

1. A manpower shortage vs. a shortage of the services provided by the manpower in question. A shortage of a specific health service to the public does not necessarily imply a derived shortage of health manpower. For example, an implied shortage of physicians may be obviated by the use of higher capital-labor ratios, or by better utilization of less-skilled workers. The tools of economic and operations analysis may be used to explore whether manpower utilization patters are likely to adjust to changes in demand, changes in factor prices, or to technological change. Illustration: In the dental profession, the supply of dental services has increased in recent years by means of a rising ratio of equipment and auxiliary personnel to dentists.[2]

2. An aggregate or general shortage vs. a geographically restricted shortage or a subspecialty shortage caused by maldistribution of resources. The measures appropriate for alleviating an aggregate shortage may be quite different from those designed to mobilize manpower into a particular region or specialty. Illustration: There are differences in the relative shortages, of any version, depending on geographical region, e.g., rural vs. metropolitan, and for different subspecialties within a profession. Yett has in part demonstrated this for the nursing profession.[3]

---

[2] Jeffrey H. Weiss, *The Changing Job Structure of Health Manpower*, 1966 Harvard dissertation, ch. IV.

[3] Donald E. Yett, "The Causes and Consequences of Salary Differentials in Nursing", presented at the meetings of the Western Economic Association, Aug. 26, 1966, Berkeley, California.

3. A short-run and possibly transitional shortage vs. a long-run projected shortage. A short-run manpower shortage would require different remedial action from a long-run shortage. For elimination of the former type shortage, temporary measures such as the recruitment of foreign professionals may be used. For the elimination of the latter shortage, the problem should be attacked at its roots, i.e., measures must be directed at the sources of manpower supply. Illustration: Alleviation of a short-run nursing shortage is dependent on increased labor force participation of already trained nurses, while a long-run shortage may be remedied by recruitment of a larger percentage of the qualified population into the nursing profession.

4. A shortage determined with respect to relative earnings changes vs. a shortage determined on the basis of relative internal rates of return. These two analytical approaches to health manpower shortages address themselves to questions of efficiency in human resource allocation among alternative professions. As such, the concept of manpower shortage is employed in a sense quite different from the excess demand over supply concept referred to in 1-3. For example, using Hansen's approach[4] one may demonstrate a relative shortage in one profession with respect to alternative professions, while no "shortage" is evident according to the excess demand concept.

Which type, version, or level of manpower shortage concept any given investigator will utilize depends on his respective function, objectives, and magnitude of the resources at his disposal. But in the absence of precise definition and specification of the particular concept of shortage utilized in an analysis, it is impossible to determine what constitutes evidence for the existence of a manpower shortage, while it is also unlikely that steps toward the alleviation of shortages can be suggested or properly evaluated.

---

[4] W. Lee Hansen, *op. cit.*

In summary, relatively little confidence can be attached to available assessments and conclusions regarding present and prospective health manpower shortages because (1) the definition of "shortage" is often vague, and (2) the assessments and conclusions are based on investigation containing inadequate evidence (such as unfilled, budgeted job vacancies, or simple extrapolations of health personnel population ratios) and on non-analytical statements of causal factors. Thus, it follows that understanding of the problem could be greatly enhanced by more explicit definition of what is meant by "shortage" and by a more analytic approach to the casual factors and interrelationships.

DR. IRENE BUTTER, *Research Associate, Bureau of Hospital Administration*
LAWRENCE A. HILL, *Director of Program and Bureau of Hospital Administration*
DR. RICHARD C. JELINEK, *Assistant Professor of Industrial Engineering and of Hospital Administration*

PART B

INTRODUCTION

Health manpower research is concerned with a variety of problems involved in the production and use of certain human resources for the specific function of providing health care. Since the health care field is such a large one with a broad spectrum of jobs to be performed within it, and since manpower and human resources questions are so varied, the relevant research in this whole area is also diverse.

This report, submitted in partial fulfillment of Public Health Service Contract PH 108-66-201(P) is an attempt to describe the current status of research on health manpower problems in terms of research activities and the development of research talent. Very little has been written on the work being done in this area of research. Consequently this report has been compiled from a wide range of sources and is likely to be incomplete. As is discussed in section V of this report, we have attempted to keep abreast of significant activities in research and in training through government publications, various journals, abstracts and bibliographies, and communications with other researchers. Naturally, it must be assumed that there are activities which pertain directly to the advancement of research in health manpower which we have missed in our efforts to report the status of the field.

The major section of the report is concerned with training people to do health manpower research. Section I discusses the current status of training, describing the training given by hospital administration and medical care organization programs in the health field, and by the social science fields of economics and sociology as well as by industrial engineering. The problem of attracting able researchers into this particular area of interest is touched on in the discussion of the current status of talent development and is also discussed in the section on the development of a graduate training program in health manpower research. Here ideas are presented on various methods of increasing the supply of researchers and some suggestions are made as to the potentially most effective methods.

The remaining sections of the report are mostly concerned with a review of what research is being done currently in health manpower and of who is actively involved in this research.

SECTION ONE

STATUS OF GRADUATE TRAINING FOR HEALTH MANPOWER RESEARCH

There are no formal training programs in health manpower at the present time and it appears unlikely that there will be in the near future. Despite the fact that health manpower is generally considered a distinct area of research, the researchers in this field demonstrate a variety of skills and training backgrounds, which they apply to a variety of problems in health manpower. Any examination of the status of training for health manpower research, therefore, must go beyond the specific subject to look into other training that could possibly be applied to the study of health manpower problems.

With this understanding we have surveyed a wide range of academic programs to find training which provides students with the analytic skills and background, and perhaps, the motivation necessary to undertake research on health manpower. Although these researchers would not have been trained to work on health manpower problems specifically they could be considered potential health manpower researchers since they would have the capability to do research in this area.

Since health manpower research can be considered an outcropping of both manpower research and health research we approached the survey of existing training programs from two directions. We examined the training which is currently offered in the health care field to see whether students are receiving the training necessary to do manpower research in their field. We also examined the social sciences and industrial engineering programs in an attempt to determine the amount of training available for potential health manpower researchers. Since economics, sociology, and operations research each provide a framework and methodology for research on manpower problems which can be applied to the health field, we concentrated on these fields.

It should be noted in reading the following description of the current status of this training that to make a complete survey of all programs and courses which may provide training for potential researchers would be a vast undertaking. We have attempted, instead, to cover the major areas of training and with each to describe some of the programs and courses available.

A. Training in the Health Field

We first examined the existing programs in the traditional health field to see if manpower research training is being provided. Of the varied programs, two seemed likely to deal with manpower aspects of health care--hospital administration programs and medical care programs. Consequently, these programs received our attention.

Hospital Administration Programs

There are twenty-four programs in hospital administration in the United States, sixteen of which are members of the Association of University Programs in Hospital Administration (AUPHA). The information on hospital administration programs given here is for the sixteen AUPHA programs*, since the AUPHA surveys its members regularly and was, therefore, able to provide us with information on the programs.

None of the courses offered in the programs we examined is devoted to manpower topics or aimed at developing researchers in the field. One program (Duke), however, counts as elective course for credit a sociology course (Soc. 242) entitled the Sociology of Occupations and Professions.

Although hospital administration programs do not offer courses devoted entirely to manpower, material on health manpower is taught in required courses in all the programs. As the following table indicates, the amount of time spent on such subjects as medical personnel, education, supply and distribution of physicians and other health care personnel, general practice and specialization, and group medical practice varies from 6.5 hours to 60 hours out of a total of 176 hours devoted to teaching medical care topics. This is over and above any time spent on the strictly administrative aspects of manpower management taught to hospital administration students.

---

*The sixteen programs are those located at Baylor University (U.S. Army), University of California - Berkeley, University of California - Los Angeles, University of Chicago, Columbia University, Cornell University, Duke University, George Washington University, University of Iowa, University of Michigan, University of Minnesota, University of Pittsburgh, Saint Louis University, Medical College of Virginia, Washington University (St. Louis), and Yale University.

Table 1. Amount of Time Devoted to Manpower Course Material in Seventeen Hospital Administration Programs in 1966*

Average 1958	12.2 hours
Average 1966	15.8
Change 1958-66	+3.6
Median 1966	22
Minimum 1966	6.5
Maximum 1966	60

Along with the course content, the topics of theses written by these students also give an indication of the extent of training for manpower research provided by the hospital administration programs. All of the AUPHA programs require that a thesis be written to receive the master's or doctoral degree, although there is variation among the schools on the emphasis placed on the thesis and on the focus of the thesis. In most cases the thesis is supposed to deal with problems met during the administrative residency, while a few programs request more academic subjects.

---

*1. Adapted from Tables II, III, IV in Gary L. Filerman, "The Teaching of Medical Care in Graduate Programs in Hospital Administration," October, 1966.

A study of the Union List of Masters Reports of Programs in Hospital Administration for 1963, 1964, and 1965, compiled by the American Hospital Association, and of the list of recent acquisitions in the AHA library reveals that many of the masters theses do deal with manpower topics or health operations research topics. Of the approximately 500 theses in the list, the fifty-five listed in Appendix B (below) deal with manpower subjects.

As the titles indicate, there is quite a variety of studies on health manpower done by the students. The theses represent almost the complete range of manpower research, including research on training, recruitment, distribution, and staffing. It can also be seen that several academic methodologies have been employed in these studies. Robert Holmes' thesis on graduates of the Iowa program in hospital administration, for instance, is a statistical study, while Dennis Barry's thesis on job mobility among nurses and James Thompson's thesis on the nurse shortage in Davidson County, Tennessee employ economic analysis. Studies using sociological or psychological analysis include Kenneth Axtell's on the status of men nurses, Paul Gross's on the motivational differences between registered professional nurses and licensed practical nurses, and Theodore Kittell's on the backgrounds and personality characteristics of subprofessional nurses. The methods developed in operations research and industrial engineering have probably been used in most of the staffing and utilization studies, particularly those done by Clark, Cross, Dykes, Hass and Hansen.

Table 2. Hospital Administration Masters' Theses by School and Subject

Hospital Administration Schools	Number Manpower Theses	Number on Training	Number on Staffing	Number on Nurses	Number on M.D.'s	Number on Recruitment	Number on Hospital Admin.	Number on Salaries
Baylor	6	1	5	0	0	0	0	0
Berkeley	3	0	1	0	1	0	1	0
Chicago	5	1	2	2	0	0	0	0
Columbia	1	0	0	0	0	0	1	0
Iowa	6	2	1	0	2	0	1	0
Michigan	3	2	1	0	0	0	0	0
Mich. State	1	0	0	0	0	0	1	0
Minnesota	13	2	4	2	2	2	1	0
Pittsburgh	4	1	0	0	2	1	0	0
Virginia	11	2	4	3	0	0	1	1
Yale	1	0	1	0	0	0	0	0
Totals	54*	11	19	7	7	3	6	1

*One thesis was not identified by school.

The table showing the distribution of theses by school does not indicate that any one school is predominant in manpower topics, although Minnesota led in the list we were able to compile. Not all hospital administration programs submit their theses topics to the AHA, however, and, furthermore, the theses listed here probably vary in quality significantly. For these reasons, this list is too limited to cite any one program as producing a significant amount of manpower research or to dismiss the manpower research efforts at any other hospital administration school. Rather the list and the tables should be looked on simply as an indication of the training being given in these schools for health manpower research and health operations research.

As the examination of course content and theses topics has shown, there is some training for potential health manpower researchers provided in the hospital administration programs. Noting that this training is given, however, does not indicate whether the various programs are actually producing graduates who will continue to do research, or whether they will follow strictly administrative careers.

In an attempt to get an idea of the kinds of jobs held by program graduates, we tallied the positions listed on the alumni mailing lists of three schools (551 alumni). The distribution of positions can be seen on the following table.

Table 3. Positions Taken by Graduates in Hospital Administration*

Position	Number
Administrators or Supporting Hospital Positions	497
Teachers of Hospital Administration	13
Hospital Consultants	11
Hospital Planners	4
Academic Research Associates	6
Doctoral Candidates	5
Insurance	2
Medical Doctors	3
Systems Analysts	2
Manpower Program Director	1
Health Commissioner	1
Other	6

*Compiled from mailing lists of alumni of University of Pittsburgh, Cornell University, and Yale University Programs in Hospital Administration, 1966 lists.

The overwhelming number of graduates (497) are currently employed as hospital administrators or in other administrative positions in hospitals. It is impossible to estimate how many of these people would include research, and particularly health manpower research, as part of their jobs. Some undoubtedly do, but it must be assumed that the majority does not. Of the occupations listed, several certainly involve research in the health field. The academic research associates, doctoral candidates, and teachers of hospital administration all work in an academic setting and it can be assumed that they all are conducting research on at least a part-time basis. The other occupations could conceivably involve research, but once again, it is impossible to tell.

These figures do not cover the entire range of hospital administration degree holders and the distributions of jobs listed may be inaccurate to some degree, but from this list one conclusion can be drawn which supports the evidence of the course content and thesis topics. This conclusion is that hospital administration programs are concerned primarily with producing health care administrators and that the majority of graduates do take administrative positions. These programs have increased their emphasis on research training, however, for the purpose of turning out administrators with research capabilities and of training graduates for planning careers in the health care field. This increasing emphasis on non-administrative topics can be seen in the growing diversity of positions taken by graduates, but whether this can be taken as a sign that hospital administration programs are producing potential health manpower researchers is not easily determined at this point.

Medical Care Administration Programs

Medical care administration training is located in schools of public health at the University of Michigan, Columbia University, University of California at Berkeley, University of California at Los Angeles, University of Pittsburgh and at Yale University. All six schools emphasize their masters degree programs although several offer a doctoral degree program also. A statement of objectives is included in Appendix C for each program. It can be seen from these statements that, while there is a certain research orientation, the focus is on training students for administrative careers.

A review of the courses offered to medical care students, the topics of theses written by the students, and the kinds of jobs taken by graduates leads to the conclusion that the medical care administration programs are not a particularly fertile source of potential health manpower researchers.

The tables in Appendix C, taken from the background material distributed at the Conference on Teaching of Medical Care Administration held June 24-26, 1965, at the University of Michigan, indicate the courses taken by 1964-65 academic year graduates by frequency of enrollment for each program. As the tables show, there was only one course offered which can be considered a manpower course. This is Management of Human Resources - Labor Relationships (Bus. Ad. 250) at the University of Pittsburgh. Furthermore, this course had only one medical care student enrolled and was an offering of another department.

An investigation of thesis topics in medical care bears out the evidence that there is little emphasis on manpower problems. A study of thesis topics for the past several years by Professor Roy Penchansky of the School of Public Health of the University of Michigan has shown that no theses have been written that are relevant to manpower topics.

As the stated objectives of the programs and the course content suggest, the medical care administration graduates are trained for administrative positions. A check of the types of jobs taken by the graduates shows that administrative positions are indeed the most common. (Tables showing the work setting and type of work of 1963-64 program graduates are included in Appendix C). Thus, it must be concluded that, while some potential manpower researchers may be produced by the medical care administration programs, these programs will not produce very many and are not the best source of such researchers.

---

*Personal communication with Professor Roy Penchansky

STATUS OF TRAINING IN THE SOCIAL SCIENCES FOR POTENTIAL HEALTH MANPOWER RESEARCHERS

While the traditional health field provides some training, the preponderance of training for potential manpower researchers is found in the social sciences. Specifically, there are courses offered in the fields of economics, sociology, and operations research which prepare researchers to work on problems of health manpower by outfitting them with the tools of analytic research. There are also interdisciplinary centers within the universities where, using a combination of resources, emphasis is placed on research training particularly relevant to health manpower and health operations research problems. Some of the more prominent centers are highlighted here to give an indication of the scope of activities in this area. Following this is a survey of the courses offered in selected universities in such subjects as manpower economics, sociology of human resources, and health operations research.

A. University Manpower and Operations Research Centers

Until the past year, the number of centers devoting their energies to manpower research was minimal, and of these centers an even smaller number were concerned solely with this research. In 1966, however, the Department of Labor's Office of Manpower Policy, Evaluation, and Research (OMPER) made substantial grants to seven institutions to establish manpower research training centers. The grant recipients were Atlanta University, Iowa State University, The University of Maine, North Carolina State University at Raleigh, Oklahoma State University, Temple University, and Virginia State College at Norfolk.

Statements of the research objectives and planned developmental activities of each of these manpower centers is included in Appendix D as well as progress reports and descriptive materials for the programs.

As outlined in the OMPER listing of research projects*, the objectives of these manpower centers are to attract faculty members to manpower research, to train students at both the undergraduate and graduate level for manpower research, and to assemble the research capabilities for extensive future projects in manpower. A variety of methods is being used to further these objectives. At Iowa State University a summer institute is being held on manpower training for scholars and advanced graduate students. Part of the activities under this grant at the University of Maine is a graduate seminar on manpower research. Temple University is offering fellowships to Ph.D. students in economics to study manpower topics.

Most of these centers take an inter-disciplinary approach to specific manpower problems. At Iowa State University the manpower group is located within the

---

*U.S. Department of Labor, Manpower Administration, Manpower Research Projects Sponsored by the U.S. Dept. of Labor, Manpower Administration, through June 30, 1966, pp. 45-47.

Industrial Relations Center and is composed of people from the psychology, sociology, and economics departments. At Main the researchers are educators, economists, political scientists, and sociologists. The Oklahoma State University center draws from the departments of sociology, economics, industrial education, and psychology and at Virginia State College, the departments of economics, sociology, and psychology are once again represented, in addition to the department of business administration.

The particular areas of manpower research in which these centers are interested are problems of discrimination in employment and unemployment, manpower development for the Great Plains States Region, manpower under-utilization, manpower problems unique to the South, manpower problems in low-income areas, and determining regional manpower needs. While none of these manpower topics pertains directly to the health field, the students and faculty who gain experience working on these projects could use this experience in conducting manpower studies in the health field. For this reason, these OMPER centers are an important development for those concerned with health manpower research.

Besides the special manpower centers established by OMPER, there are other university centers which have been concerned with economic research or operations research relevant to health manpower. The nine centers mentioned here do not exhaust the list of such centers, but they represent some of the major ones. They are included here because this sort of institution plays an important role in creating a research environment which attracts students to this area of interest and because most provide informal, if not formal, training for graduate students.

Among the most prominent centers for health economics study is the Harvard University Interfaculty Program on Health and Medical Care. This program is a joint effort of the Schools of Public Health, Medicine, Business Administration, and Public Administration, and the Department of Economics. Graduate degrees can be obtained in the health field, public administration, and economics. There has been some work done on health manpower in this group and one dissertation on health manpower has already been produced[*] but the emphasis has generally been a broader one, concentrating on public issues in the provision of medical care. Since the program is specifically designed to provide a strong background in economic research to students interested in health topics, it is a potential source for health manpower researchers.

Major centers for the study of manpower and human resources are the Princeton Industrial Relations Section,[†] Herbert Parnes' Human Resources Development Group at Ohio State University, the Pennsylvania State University Institute for Research on Human Resources,[†] the Institute of Industrial Relations at the University of California at Berkeley, the Conservation of Human Resources Project at Columbia, and the Workshop on Economics of Human Resources at the University of Wisconsin.[†]

---

[*] Jeffery H. Weiss, The Changing Job Structure of Health Manpower
Ph. D. Dissertation, Harvard, 1966.

[†] Descriptive material on the activities of these centers-Append

The center at Princeton is headed by Professor Frederick Harbison and is particularly interested in manpower economics. In conjunction with this group, several graduate students are writing doctoral dissertations on manpower, including one on the demand and supply of physicians.* The section is also preparing a study under the direction of Anne Somers of the management and utilization of manpower in hospitals.†

Herbert Parnes, an economist, has directed the Human Resources study group at the Ohio State University College of Commerce and Administration for several years. Among the publications of this group is a Survey of Current and Recently Completed Research on High-Level Manpower Utilization in the United States prepared for the Organization for Economic Cooperation and Development in 1965. Included in this survey are some references to projects in health manpower.

The Institute for Research on Human Resources at Pennsylvania State University is an interdisciplinary social science research center under the direction of Professor of Economics, Jacob J. Kaufman. This group, which appears to be economically oriented, provides research assistantships for M.A. and Ph.D. candidates in various departments, and recently has been conducting research in such areas as the evaluation of Federal manpower programs, the economics of medical care, and on labor markets. Their interest in health manpower is demonstrated by their sponsorship of a conference on "Meeting Nonprofessional Manpower Requirements in Health Service Activities" held April 24 and 25, 1967.

---

*See letter from George Monsma to Dr. Irene Butter in Appendix E.

†See letter of Frederick Harbison to Dr. Butter, October 19, 1966, in Appendix E.

One of the many interests of the Institute of Industrial Relations at Berkeley has been manpower studies, and particularly manpower requirements forecasts. This is one aspect of manpower study which certainly is of concern to health manpower researchers. Indicative of the kind of manpower research the Institute has done is The Conference on Methods of Projecting Manpower Supply and Demand, held at the Brookings Institution June 25-26, 1964, and the titles of some of their recent publications. There have been studies on high-level manpower such as George Strauss' Professionalism and Occupational Associations, (reprint no. 203) and Arthur M. Ross' How Do We use Our Engineers and Scientists? (reprint no. 239) and more general manpower studies on a national scale such as Raymond E. Miles' Human Relations or Human Resources? (reprint no. 261), Margaret S. Gordon's two papers, U.S. Manpower and Employment Policy: a Review Essay, (reprint no. 249) and Work and Patterns of Retirement (reprint no. 170), and Paul Jacobs' Unemployment as a Way of Life (reprint no. 276). They have also done some work in the area of medical economics as demonstrated by Joseph W. Garbarino's paper, Price Behavior and Productivity in the Medical Market, (reprint no. 135).

Professors W. Lee Hansen and Burton A. Weisbrod at the University of Wisconsin have just begun a Workshop on the Economics of Human Resources as part of the new Institute for Research on Poverty. The first year is being devoted to studies on the economics of education but Hansen and Weisbrod, who have previously done research in health economics, intend to investigate the health field in the future. Graduate credit is given to students taking part in the Workshop.

The three leading centers for operations research in the health field are at the University of Michigan, Johns Hopkins University, and at Georgia Institute of Technology. In the Industrial Engineering Department at Michigan there are several people including Herbert Galliher, Richard Jelinek, and Karl Bartscht who are doing work in the health field. Karl Bartscht's Hospital Systems Research Group in the Industrial Systems Research Laboratory has done a large amount of work on hospital systems and particularly on manpower utilization within hospitals. Similarly, Charles Flagle and John Young in the Department of Operations Research and Industrial Engineering at Johns Hopkins University and Harold E. Smalley and his associates in the Hospital Systems Research Group have also been involved in operations research in the health field. The work of Smalley's group at Georgia Tech reflects a more traditional industrial engineering approach than that done at the other two schools. At all three universities, graduate students work with these research groups and gain experience in applying their operations research training to manpower problems.

B. Courses in Manpower and Health Operations Research

One indicator of the status of training for health manpower research is the centers for research which attract and train researchers. Another indicator is the number and nature of courses offered to potential researchers in the field. As has already been noted, we have been unable to discover any courses entirely devoted to health manpower. It has been necessary, therefore, to examine the training offered by more general courses. In doing this we have concentrated our attention on the fields of economics, sociology, and industrial engineering since many current researchers have backgrounds in these fields and because each offers a theoretical framework for analytic research.

In surveying courses currently being given in manpower or health operations research, it was necessary to be selective, as we have been throughout this report. We chose the universities to be surveyed by taking the lists of the top graduate departments in the fields of economics and sociology from the American Council on Education's report, An Assessment of Quality in Graduate Education, Washington, 1966. We examined the course offerings at these selected universities to find relevant courses, and wrote to the professors offering the courses to request more information about them. Samples of the letters we sent are included in Appendix F. Since the number of universities offering training in operations research is relatively small and the number of these known to have some interest in health operations research is even smaller, we wrote directly to men in these departments interested in health for information on any relevant courses.

The overall findings of this survey are that there are a signifcant number of economics and sociology courses giving training in manpower research, but only a few courses covering health in the operations research departments.

Economics Courses

A search through the course catalogues of the leading twenty-nine economics departments* revealed that courses on manpower economics or the economics of human resources are being offered at Princeton University, Michigan State University, the University of Michigan, the University of Wisconsin, the University of Illinois, Iowa State University, Wayne State University†, and at the University of Maine†.

At Princeton, Professor Frederick Harbison, Director of the Industrial Relations Section, teaches Manpower and Labor Problems (Economics 303). Among the topics covered in this course are "processes of human resource development, and investments in education and training; and critical decisions in the evaluation of national manpower and education policy."

---

*The twenty-nine schools are: Harvard, MIT, Chicago, Yale, California (Berkeley), Stanford, Princeton, Michigan, Columbia, Wisconsin, Minnesota, Northwestern, Carnegie Tech, Pennsylvania, Johns Hopkins, UCLA, Brown, Cornell, Duke, Illinois, Indiana, Iowa State, Michigan State, North Carolina, Purdue, Rochester, Vanderbilt, Virginia, Washington (Seattle).

†Information obtained in connection with other research.

At Michigan State University, Manpower Economics (Economics 457) has in recent years been taught by Professors Charles Killingsworth, Sabbiah Kannappan, and Einar Hardin. The catalogue description given for the course lists the following topics covered in the course, "Leading theories explaining wage determination, wage differentials and trends in wage structure, labor force composition, distribution of unemployment, labor mobility, and manpower utilization." A research paper on Poverty, Discrimination, or Barriers to Training or Entry into Occupations is required.

At the University of Michigan, Professor John Parker teaches Economics of Human Resources. Among the topics covered in this course are: occupational choice, labor force participation, shortages in labor markets, surpluses in labor markets, mobility and information in labor markets, education and training, migration and investment in education, education and economic development, and manpower and education policies.

Professor W. Lee Hansen at the University of Wisconsin offers an economics course on Human Resources Development and Economic Growth, open to undergraduate and graduate students. The major emphasis is on the research paper, for which a list of topics is included in Appendix A along with the other course materials.

Two courses in manpower economics are offered at the University of Illinois. Professor Vladimir Stoikov teaches a Seminar on Investment in Manpower (Labor and Industrial Relations 490) and Professor John Parrish teaches Manpower Resources and Policy (Economics 444). Both courses are graduate seminars. Professor Stoikov reports that his course is attended by graduate students in the Institute of Labor and Industrial Relations, the School of Education, and in the Department of Economics. In the reading list he states that the seminar covers "activities which influence future monetary and psychic income by improving the resources in people. The investments covered include schooling, on-the-job training, medical care, migration, and the search for information on prices and incomes--with main emphasis on education and health." Professor Parrish's course, which was introduced three years ago, attracts students from the fields of economics, industrial relations, industrial psychology, and vocational-technical education. He writes that the seminar emphasizes individual research and that one student has written in the past semester on a health manpower topic, specifically the shortage of nurses with particular reference to Illinois.

At Wayne State University, also, there are two courses given in the economics of human resources. Professor A.G. Holtmann offers one course (Economics 0742) and Professor Hector Correa offers the other. One of the areas covered in Professor Holtmann's course is Professional Labor Markets. In this section he deals specifically with shortages in health manpower, making use of papers such as Elton Rayack's "The Supply of Physicians' Services" [Industrial Labor Relations Review (January, 1964)], W. Lee Hansen's "'Shortages' and Investment in Health Manpower" [The Economics of Health and Medical Care (Ann Arbor, The University of Michigan Press, 1964)], and his own review "Another Look at the Supply of Physicians" [Industrial and Labor Relations Review (April, 1965)].

At least two of the seven OMPER manpower research centers offer courses in manpower economics. At Iowa State University, Associate Professor Edward Jakubauskas, Director of the OMPER center, is teaching an undergraduate course, Manpower Economics (Economics 441). The topics covered are labor market structure and manpower utilization, labor market imbalances, and manpower development policies. In connection with the manpower research center at the University of Maine, a graduate seminar in manpower economics is being given. This course, reflecting the activities of the center, focuses on problems in regional manpower development and manpower underutilization.

Sociology Courses

Our survey of the thirty-four leading sociology departments* indicates that there are many sociology courses dealing with manpower or health manpower being offered. At nineteen of the thirty-four universities there are one or more courses given in such areas as the sociology of occupations and professions, industrial sociology, and sociology of medicine.

---

*California (Berkeley), Harvard, Columbia, Chicago, Michigan, Wisconsin, Cornell, Princeton, Minnesota, North Carolina, UCLA, Stanford, Washington (Seattle), Northwestern, Yale, Washington (St. Louis), Michigan State, Illinois, Indiana, Johns Hopkins, NYU, Oregon, Pennsylvania, Texas, Brown, Duke, Iowa, New School, Ohio State, Penn State, Pittsburgh, Purdue, Southern Cal., Washington State.

Table. Surveyed Universities offering Sociology Courses Relevant to Manpower, by Type of Course

Occupations & Professions	Industrial Sociology	Sociology of Health & Health Professions	Social Aspects of Manpower
Wisconsin	Northwestern	North Carolina	Columbia Univ.
Michigan State	Ohio State	Minnesota	
Minnesota	Purdue	Ohio State	
Pennsylvania State	Harvard	New York Univ.	
Washington State	Oregon	Iowa	
New York Univ.	Pennsylvania		
Purdue	Iowa		
Indiana	Indiana		
U. of Washington			
Princeton			
Oregon			
Duke			

These courses vary quite a bit in their content from school to school so that not all courses classified in one of these areas are relevant for manpower students.

The twelve courses in the sociology of occupations probably offer the most background in manpower sociology of the three areas since they treat such topics as education, the development of occupations, occupational mobility, occupational aspirations and choices, changes in the occupational structure, and special employment problems of some groups (e.g., women and racial minorities). Many deal with the medical profession and other health professions specifically. The reading lists include many references of interest to health manpower researchers. Some of the most frequent are Robert K. Merton, The Student Physician, Oswald Hall, "The Stages of a Medical Career" [American Journal of Sociology, 1948] and "Types of Medical Careers" [AJS, Vol. LV], Eliot Freidson, "Client Control and Medical Practice" [AJS, January, 1960], and Everett C. Hughes, 20,000 Nurses Tell Their Story.*

Industrial sociology is a much more general area of study than the sociology of occupations and is taught in a great many universities. At Ohio State, in fact, there is an industrial sociology major in both the College of Commerce and the College of Arts and Sciences. This field pertains to manpower in that it deals with the relationship of man to work and to the organizations of work. The emphasis within this area varies considerably, however, so that such subjects as organizational theory, group behavior, and the economics of industrialization are embraced. Some of the courses are almost exclusively theoretical, discussing the place of work in society, while others are little more than management courses in personnel relations. A sociologist working in manpower research would most probably have some experience in industrial sociology, however, so the materials from these courses are included with this report, although the courses on occupations and professions are more directly relevant to health manpower research.

---

*Others include: William Glaser, "Doctors and Politics", AJS, LXVII, Nov., 1960; Talcott Parsons, "The Case of Modern Medical Practice", Ch. X in The Social System; Ester L. Brown Nursing as a Profession, 1966; Eliot Freidson, Patients' Views of Medical Practice, 1961; Leonard Reissman and John Rohrer, Change and Dilemma in the Nursing Profession; D. Rurschmeyer, "Doctors and Lawyers: A Comment on the Theory of the Professions", Canadian Review of Sociology and Anthropology, No. 1; Everett C. Hughes, "The Making of a Physician", Men and Their Work; and Oswald Hall, "The Informal Organization of the Medical Profession", Canadian Journal of Economics and Political Science, XII (February, 1946).

There is a third and much smaller group of courses in sociology which are of interest to people studying health manpower. These are the courses in the sociology of health. There are more courses given in medical sociology than is indicated in our table, but the preponderance of these are concerned with social aspects of disease and with epidemiology. There are, however, courses at North Carolina, Minnesota, Ohio State, and New York University which discuss the health professions and their role in the distribution of health care. Even the courses which do include the health professions, however, concentrate their attention for the most part on the sociology of disease.

Operations Research Courses

While there is a significant amount of work being done on the applications of operations research to the health field, the number of courses currently available covering this topic are few. As part of the survey of courses relevant to health manpower in the various academic disciplines, we wrote to professors at fifteen universities inquiring whether they are teaching any courses which include study of health systems.* The replies which we have received are included in Appendix F.

---

*The professors and schools to whom we wrote are: Charles Flagle and John Young, Johns Hopkins University; W.R. Hudson, University of Iowa; Robert B. Fetter, Yale University; Joseph Emerzian, University of Connecticut; Harold E. Smalley, Georgia Institute of Technology; Burton V. Dean, Case Institute of Technology; Gerald Nadler, University of Wisconsin; Harvey Wolfe, University of Pittsburgh; Thomas Rockwell and Daniel Howland, Ohio State University; Ronald Gue, University of Florida, Robert M. Eastman, University of Missouri; Joseph Balintfy, Tulane University; and Jay Goldman, North Carolina State University

Only two of the fifteen universities have courses in health systems, although there are several which take examples from the health field for use in other courses. Thus, as Burton V. Dean at Case Institute of Technology stressed, by the time students have completed the graduate program in operations research they are experienced in working in health systems.

The schools where specific courses are taught are the University of Michigan and Georgia Institute of Technology. Richard Jelinek and Paul Feldstein have been teaching a graduate research seminar in Medical and Hospital Care Systems at Michigan.* There also is an undergraduate seminar on Hospital Systems given by Professor Johnson. Students taking the undergraduate and graduate individual research courses can also elect to work in the health field. At Georgia Tech there is a hospital systems sequence for graduate students working in health. This consists of Industrial Engineering in Hospitals, Case Studies in Hospital Management Systems, and Projects in Hospital Management Systems.

In general, the fields of economics, sociology and operations research are producing potential health manpower researchers. In economics and sociology, manpower research capabilities are being developed through courses on manpower and in these courses students are being exposed to manpower research in the health field through the various papers dealing with health manpower cited above. While the number of operations research courses in health is few, students in this field do receive some exposure to work in health at most of the schools, which, combined with their theoretical training in operations research, does make them potential health manpower researchers.

---

*For more complete description of the teaching activities of the project directors, see Part C of this report

C. Support for Research Training

A significant problem in the production of health manpower researchers is finding a means of attracting talent into the field and any discussion of the status of training would be incomplete without some mention of training support. Three sources of support for graduate students which have been effective in drawing them into the area of health or manpower research have been the fellowships awarded by the Kellogg Foundation, the dissertation support which has been given to operations research students at Johns Hopkins University, and the dissertation grants which OMPER has awarded to students writing on manpower topics.

The specific purpose of the Kellogg Fellowships has been to attract researchers from non-health fields into the health field, by providing fellowship money for them to work in conjunction with hospital administration programs. The foundation has supported Kellogg Fellows at the University of Michigan, the University of Minnesota, George Washington University, the University of Chicago, and Columbia University. Among the various fields of the Fellows are industrial engineering, political science, industrial psychology, sociology, economics, and statistics. The Kellogg Fellowships have shown considerable success in attracting researchers who have continued to work in the health field after receiving their Ph.D. degrees. The major problem which has been encountered in achieving this aim is that some of the Fellows are being recruited into high-paying positions in the health field before they complete their graduate studies. Of the three most recently graduated Fellows at the University of Michigan, two are still active in health research. These are Richard Jelinek, director of this project, whose field is industrial engineering, and David Gustafson now at the University of Wisconsin, who is also an industrial engineer. Of the Fellows from the University of Chicago, most are still in the health field. Paul Feldstein is associated with this manpower project, Montague Brown is employed by the New Jersey Hospital Association, Wolf Heydebrand is now an Assistant Professor of Sociology at the University of Chicago and is extending his dissertation on hospital organization, and Albert Aldaheff is continuing research in the economics of health at the Research Triangle Institute in Durham.

A more informal program which has also been highly successful in attracting graduate students to do research in the health field and keeping them in the health field has been the program of doctoral dissertation support in the Operations Research and Industrial Engineering Department at Johns Hopkins University. Under the leadership of Professors Charles Flagle and John Young, money has been obtained from the Public Health Service to support doctoral students in research. Graduates of this program are Ronald Gue, now at the University of Florida, Joseph Balintfy, now at Tulane University, Harvey Wolfe, now at the University of Pittsburgh, and Robert Connor, of the National Institutes of Health. All of these men are still active in health operations research.

The Office of Manpower Policy, Evaluation, and Research (OMPER) of the Department of Labor has instituted grants in support of doctoral dissertations on manpower topics. Three of the students they are supporting are writing on subjects directly relevant to health manpower. Myron D. Fottler at Columbia University has received $4900 and is writing on "Training and Retraining of Non-professional Manpower in New York City Hospitals". He is a candidate for the Ph.D. in Business specializing in Industrial Relations and Management. Jane G. Jones at Brandeis University has received $12,320 in support of her dissertation on "The Career Patterns of Women Physicians". Her background is in education and public health. James A. Sweet, at the University of Michigan, is an economics student who has switched into the department of sociology. He has received $11,765 in support of his dissertation on "Family Composition and the Labor Force Participation of Married Women." Since many of the health occupations have such a high proportion of women, this is a topic which would be of interest to health manpower researchers.

SECTION TWO

DEVELOPMENT OF A TRAINING PROGRAM FOR HEALTH MANPOWER RESEARCH

The preceding section presented a picture of the current status of training for health manpower research. It was pointed out that there currently is no specialized training for health manpower research but that various academic disciplines are producing potential researchers. Based on the information gathered in our survey of current training, this section discusses the development of a graduate training plan for health manpower research in terms of the development of other new areas of study and of the particular nature of health manpower as a subject for research.

Before any plans for a new specialized graduate training program in health manpower can be developed, it is first necessary to decide whether there is justification for the establishment of the program in the first place. The purpose underlying the development of such a program would be to increase the number of people doing research in health manpower by producing specialists holding degrees in health manpower. The essential question is whether the quantity and quality of research in health manpower would be enhanced by producing these health manpower specialists. Our examination of the research needs in the field, the nature of problems in health manpower, and the development of other new fields, leads us to conclude that the establishment of special training in health manpower would do little in this regard and would, instead, be a waste of resources. For this reason, we oppose the establishment of such special training.

Our primary objection is that health manpower is not an academic discipline with a body of unique theoretical knowledge and unique methodologies. On the contrary, research in health manpower is aimed at the production and use of certain human resources. This is a problem which is not unique to health but which is broad in nature and would benefit from a broad approach.

Health manpower problems require the application of academic skills in analytic research for high quality research. Our investigation has shown that there is not one academic field but several which can produce good researchers in this area. The following table gives an indication of the distribution of disciplines represented by the researchers we have encountered in this area.

Table. Academic Backgrounds of 200 Researchers in Health Manpower

Field	Number of Researchers	Percentage of Sample
Economics	107	53.5
Industrial Engineering	43	21.5
Sociology	13	6.5
Medicine	13	6.5
Hospital Administration	9	4.5

Table. Academic Backgrounds of 200 Researchers in Health Manpower, Cont.

Field	Number of Researchers	Percentage of Sample
Psychology	5	2.5
Nursing	4	2.0
Public Administration	2	1.0
Home Economics	2	1.0
Industrial Relations	1	0.5
Biostatistics	1	0.5

To train a health manpower specialist would necessitate acquainting the researcher with tools and methodologies in economics, sociology, operations research, and in psychology, as well as providing a good background in the health system. In practice this would mean that the student would either receive such a smattering of training in the various disciplines that he would not be qualified to do meaningful research in any of them, or that his training emphasized one discipline and excluded all others to such a degree that he simply would have received training duplicating that available in another field. Clearly, either of these alternatives would result in a waste of resources.

Indeed, Milton Roemer, who has been very active in the development of training for health specialists and who has developed a graduate doctoral program in the social aspects of health (medical care administration)* has always emphasized that his programs are for producing administrators and not academicians. In the case of administrators, a specialized curriculum for the health field which includes some exposure to various academic methodologies may be appropriate. It is in this area that the professional programs serve a genuine function.

It is our belief, however, that research in health manpower requires a strong background in an academic field such as economics or operations research and that a special degree program in health manpower would not be suitable for provision of such a foundation in an effective manner.

Investigating the experience of other fields when they were first emerging, such as economics of social security or gerontology, is helpful in deciding on a course of producing more researchers. The economic question which arises at this point in development for any new field is whether the costs of training people specifically for the new area of research are higher than the costs of attracting equally competent researchers, who have already been trained in existing programs. Since special Ph.D. programs did not develop in either social security or gerontology, but rather existing degree programs were modified to accomodate the new areas of study, there is the suggestion that, for the short run, at least, as the field develops, it is less costly to attract trained researchers than to establish special training. As gerontology has continued to develop as a field over a period of years, training has also developed. Economics of social security, however, has been absorbed into branches of economics as the material fits within the already existing economic framework.

---

*Milton Roemer, "Education for Medical Care Administration," Hospital Administration, vol. 10, no. 3, Summer 1965.

Saying that we believe a special program in health manpower is unwise, however, does not mean that we feel that there is no need or reason to produce more good researchers for the health manpower field. The emphasis, in our opinion, should be placed, however, on attracting good scholars to the health field. Indeed, the shortage of competent researchers in this area is a manpower problem itself worthy of attention. Perhaps one of the most effective means of finding a solution would be to concentrate on providing funding for researchers already in the field to enable them to attract doctoral students and young faculty.

Holding summer institutes on health manpower might be an effective way to acquaint scholars in the various disciplines with the particular nature of health manpower problems and to encourage their research in this specialized area. The best locations for such institutes would be universities which have strong departments in economics or sociology or operations research and which also have strong medical or nursing schools or schools of public health which would cooperate in supplying data and information on specific aspects of health.

Another possible area for action to increase the quantity and quality of health manpower researchers would be to establish one or more health manpower centers at universities with strong capabilities and interests in this subject, utilizing the resources of various academic departments. The provision of post-doctoral fellowships for health manpower research, and of visiting fellowships and professorships for scholars who wish to spend a year working and studying at a center for health manpower research is also recommended. It might, furthermore, prove helpful in attracting researchers, if government agencies gave financial support to journals in the field of health manpower.

The optimal method of increasing the number of health manpower researchers, in our belief, therefore, is to increase the amount of funds for attracting talented scholars to do research in the area of health, to provide the channels and media of communication which are essential to acquaint them with the special aspects of the health field, and to promote a favorable research environment.

SECTION THREE

REPORT ON RESEARCH PROJECTS BEING CONDUCTED IN HEALTH MANPOWER AND RELATED AREAS

In this section of the report we have compiled a list of research projects of interest to health manpower researchers. The projects, which cover a period of several years and may, therefore, have already been completed in many cases, are arranged in a list organized by sponsoring agency. Under each agency heading the projects are listed alphabetically by the project director's names and are divided into two sections - those dealing with health manpower problems and those dealing with manpower or health topics related to health manpower.

Where possible we have included a description of the project. These have been taken from the published abstracts of the projects. It will be noted that in several instances the address given for the project director is outdated. We have listed in this way to indicate where the project was originally undertaken. It is our hope that the Registry of Active Researchers shows the correct current addresses for these people.

Once again it must be noted that this list is undoubtedly incomplete. We have been able to list here descriptions only for projects which are listed in the Research Grants Index (1965) of the National Institutes of Health, The Inventory of Social and Economic Research in Health (1960-1965) published by the Health Information Foundation, the Abstracts of Hospital Management Studies published by the Bureau of Hospital Administration of the University of Michigan and the Report on Manpower and Automation Research (1965) and Manpower Research Projects (1966) of the Office of Manpower Policy, Evaluation and Research of the Department of Labor. We have included additional references to projects when we have learned of them, however. Among the sponsoring agencies covered in these abstracts are the Public Health Service, National Institutes of Health, Department of Labor, state health agencies and the major foundations.

Public Health Service
and
National Institutes of Health

Health Manpower Projects

American Nurses' Association, Inventory of Professional Registered Nurses. Study in Progress at the American Nurses' Association in New York. 1966.

Bartscht, Karl G., et al., Hospital Systems Research Group, Industrial Systems Research Laboratory, Institute of Science and Technology, University of Michigan. Demonstration and Evaluation of Hospital Staffing Methods. Grant HM 00406-01, 1966.

Borland, M. and Yett, D. E. The Rate of Return on an Investment in Professional Nurse Training. Study in Progress at Washington University, St. Louis, Missouri. 1966

Chabal, Lillian, American Physical Therapy Association, 1790 Broadway, New York, New York. National Manpower Survey of Physical Therapists. Problem: To survey physical therapists, to determine where they are employed, their distribution, and where and how their skills are being utilized. Project: Survey of American Physical Therapy Association members and those physical therapists who are not members but are reported as licensed or registered in the various states or registrants of the American Registry of Physical Therapists. Local pre-test and regional sample planned. 1963.

Clombotos, John L., School of Public Health and Administrative Medicine, Columbia University, New York, New York. Part-Time Health Officers - A Study of Physician Roles. 1966.

Cooper, Ralph A., Mental Health Research Unit, New York State Department of Mental Hygiene, State Office Bldg., 333 E. Washington St., Syracuse, New York. Evaluation of Research Training for Public Health Trainees. Problem: Under a U.S.P.H.S. grant, public health nurse trainees have had a course in research methods and philosophy and have done extensive field work on a research project. The purpose of this study is to ascertain some of the effects this training and experience has had in the ways these trainees expect to approach their patients.

Donaldson, Beatrice, University of Wisconsin, Madison, Wisconsin. Effective Use of Hospital Dietary Personnel. 1966.

Elliott, Jo Eleanor, Western Interstate Commission for Higher Education, 30th Street, Boulder, Colorado. Defining Clinical Content in Graduate Nursing Programs. Problem: To continue research in the areas of medical-surgical, maternal-child nursing, public health and psychiatric nursing, to identify the graduate clinical nursing content, and to discover areas of content common to the four clinical specialties. Project: This effort seeks a synthesis of knowledge from the basic sciences, medicine, and current nursing in order to provide a sound theoretical framework for persons holding responsible positions in nursing programs at the master's level representing each of the four designated clinical specialty areas utilize library research, consultants, and their own specialized knowledge. Findings are tested in the home schools.

Falk, I. S. and Stevens, R. A., supported by Public Health Service, in progress at Yale University, New Haven, Connecticut. The Medical Specialist in Great Britain and the U.S.A. 1966.

Henry, Wilma Dean, Conducted by Commission on Education of the American Academy of General Practice, Volker Blvd at Brookside, Kansas City, Missouri. Survey of Professional Education for General Practice. Problem: How well prepared do general practitioners feel they are to carry out their functions and responsibilities as family doctors, and what changes would general practitioners recommend in professional education for future family doctors? Project: (1) To identify the interest and requirements in professional education for general practice. This would involve both undergraduate and graduate education: (2) To determine the preferences of general practitioners about ways and means of participating in continuing educational experience: (3) To analyse and test the various communication media now used in continuation education to determine the characteristics of effective continuing education programs: (4) To learn how to better disseminate existing knowledge in cancer detection and treatment. Sample: A representative sample of all general practitioners in the major regional areas of the United States.

Henry, William E., School of Social Science, University of Chicago, Chicago Illinois. Careers in Mental Health. 1966.

Hicks, Martha B., Florida State Board of Health, Jacksonville, Florida. Mental Health Psychiatric Nursing Staff Development. 1966.

Heistand, D. L., Columbia University, New York, New York. Prepared for the Health Services Research Study Section of the National Institutes of Health. Research into Manpower for Health Service. 1966.

Kemp, Hardy A., Larned State Hospital, Larned Kansas. Mental Hospital Staff Recruitment Training-Retention. 1966.

Kentucky Mental Health Foundation, Louisville, Kentucky. Conference on Mental Health Career Motivation. 1966.

Kinney, Thomas D., Duke University Medical Center, Durham, North Carolina. Study of Sources and Training of Research Pathologists. 1966.

McGuire, Christine, Miller, George E., and Larson, Carroll B., Center for the Study of Medical Education, University of Illinois, College of Medicine, P.O. Box 6998, Chicago, Illinois. The Efficient Use of Medical Education. Problem: To determine whether a more precise definition of behavioral components of professional competence in orthopedic surgery and the development of better instruments to measure this competence can increase the efficiency, the effectiveness and the flexibility of training. Project: A critical incident study to identify the nature of professional competence in this field. A systematic investigation of present certifying methods to identify which components of competence are presently measured as well as whether this can be done better; the development of new instruments to measure those that are not now being assessed. Introduction of new testing methods at stages in the training process to identify pattern of acquisition of this desired behavior in a variety of educational settings.

Melbin, Murray. McLean Hospital, Belmont, Massachusetts. Controlled Assignment of Nursing Personnel. 1966

Merrill, Irving R., University of California Medical Center, San Francisco California. Broadcast T.V. as an Aid to Continuing Education. 1966

Miller, George E., College of Medicine, University of Illinois, Chicago, Illinois. The Efficient Use of Medical Manpower. 1966

Mitchell, George E., and Connor, Kathryn J. Salaries of Dental Personnel in State Health Departments. 1962. Problem: To identify the salary ranges of all types of dental personnel in State Health Departments in 1962.

Mountain States Medical Education Study. Problems: To study the resources of the states of Idaho, Montana, Nevada, and Wyoming for providing medical education for their citizens and to recommend ways of expanding opportunity for medical education for the people of these states.

Pavalko, Ronald M., College of Letters and Sciences, University of Wisconsin, Madison, Wisconsin. A Longitudinal Study of Nursing Careers. 1966.

Pelton, Walter J. and Bothwell, Ruth D., Public Health Service. Dental Manpower Requirements in the Midwest. Problem: To measure the need for additional manpower and training facilities in six states in the Midwestern region through 1975, and to aid states in long-range plans for providing adequate supplies of dentists.

Penchansky, Roy, School of Public Health, Harvard University, Boston, Mass. Manpower and Industrial Relations in Hospitals. 1966.

Reese, Dorothy E., Public Health Service, Division of Nursing, Department of H.E.W., Study of Inactive Nurses. The shortage of professional nursing service necessitates study of all sources of nurse supply. This study is to obtain needed information about the large number of currently inactive nurses and the factors influencing their return to active nursing. A questionaire was developed to elicit information on work experience and reasons for inactivity; interest in, plans for and factors influencing return to practice; and where indicated, types of positions and fields of practice desired. Questionaires have been sent to approximately 15,000 inactive professional nurses and replies will be analyzed for employment patterns of this group. Results will also aid in planning recruitment and refresher programs. Study currently in progress.

Roemer, Milton I., School of Public Health, University of California, Los Angeles, California. Medical Staff Organization and Hospital Performance. 1966.

Sanazaro, Paul J., Association of American Medical Colleges, Evanston, Ill. Criteria for Professional Performances of Physicians. 1966.

Simmel, Arnold, Faculty of Medicine, Columbia University, New York, New York. Attitude Development of Student Nurses. 1966.

U.S. Public Health Service, Division of Dental Public Health and Resources, Bureau of State Services, Washington, D. C. Dental Manpower Guide. Problem: To aid in the solution of the dental manpower shortage by assisting states and local communities to determine their need for dental educational facilities.

Wirick, G. C. and Grenholm, G. G., University of Michigan, Ann Arbor, Michigan. Cost of Nursing Education in Hospitals. 1966.

Wolfe, Harvey and Young, John P. Staffing the Nursing Unit; Controlled Variable Staffing and the Multiple Assignment Technique.

Yett, Donald E. Variations in the Rates of Return of Physicians' Training by Specialty, Type of Practice and Geographic Region. Study in progress at the University of California, Los Angeles, California. 1966.

Yett, Donald E. An Economic Study of the Hospital Labor Market. The development of a methodology for the evaluation of patient care. Washingtion, D.C. 1960.

Yett, Donald, Social Science Institute, Washington University, St. Louis, Missouri. Economic Analysis of Hospital Nursing Shortages. Problem: Test the hypothesis that there has been a chortage of hospital personnel, especially in nursing, for the last twenty-five years. Project: Analysis of both economic and non-economic data from published surveys. Final report due: December 1964.

Public Health Service
and
National Institutes of Health

Related Projects

American Dental Association, Bureau of Economic Research and Statistics, 222 E. Superior St., Chicago, Illinois. Survey of Needs for Dental Care. Problem: To determine the dental needs of a cross-section of dental patients. 1965.

Bailey, R., Economies of Scale in Outpatient Medical Organizations. Study in progress at the University of California. 1966.

Barlow, R., The Economic Effects of Malaria Eradication. Study in Progress at the University of Michigan. 1966.

Flanagan, John C., Project Talent Office, Washington, D.C. Identification and Development of Human Abilities. 1966.

Lee, Milton O., Federation of American Societies for Experimental Biology, Washington, D.C. Study of Manpower Needs in the Basic Health Sciences. The objectives of the study are to meet the immediate and urgent need to assess manpower requirements in the biological sciences over the next decade, and to identify and define the variables which underlie the demand and supply process.

McGlothlin, William J., Belknap Campus, University of Louisville, Louisville, Kentucky. Career Motivation Study and Recruitment Project. 1966.

National Academy of Science, Washington, D.C. Career Patterns of Ph.D. Scientists. 1966.

Roe, Anne R., Graduate School of Education, Harvard University, Boston, Massachusetts. A Center for Research in Careers. 1966.

Roemer, Milton I., School of Public Health, University of California, Los Angeles, California. Medical Care Organization - Comparative Studies. 1966.

Rossi, Peter H., National Opinion Research Center, Chicago, Illinois. Factors Influencing Career Choice. 1966.

Scitovsky, A. S. Study of a New Approach to a Medical Care Cost Index. Study in progress at the Palo Alto Medical Research Foundation. 1966.

Simons, John H., financed by Institute of Industrial Relations, University of California, Berkeley, California. The Effect of Prepayment on Dental Care Utilization. Problem: The principal question is whether a population group with dental insurance uses more dental services than a comparable population group without. The extent of any such differences will be analyzed. Project: The principal index being used is the percentage of a population by age, visiting a dentist one or more times a year. Prepaid dental utilization data available through published re-

ports and personal correspondence and being compared to data reported in the U.S. National Health Survey. In addition, an analysis of the first two years' experience with a prepaid dental care program of a San Francisco Bay area labor union is underway.

Solon, Jerry A., Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pennsylvania. Research in Medical Care. 1966.

Yett, D. E. Alternative Methods of Estimating the Costs of Producing Dental Services. Study in progress at University of Southern California. 1966.

OMPER
Department of Labor

Health Manpower Projects

Cadmus, Robert R., University of North Carolina, Department of Hospital Administration, School of Medicine, Chapel Hill, North Carolina. A Manpower Study of Clinical Laboratory Personnel, Including Medical Technicians. Objectives and Procedures: This pilot project is studying jobs of a random sample of individuals performing laboratory tests in hospitals in North Carolina. The range of jobs is from that of laboratory assistant and medical technologist to clinical pathologist. Information has already been obtained by interview on a variety of background factors including education and training. Relationships among laboratory activities, skill in laboratory procedures, and individual backgrounds are examined in an attempt to sort out the various levels of skill required in the field of medical technology. Skill levels required for various clinical laboratory tasks will be related to the appropriate educational requirements.

Fottler, Myron D., Graduate School of Business, Columbia University, New York, New York. Training of Nonprofessional Manpower in New York City Hospitals. Objectives and Procedures: The study will evaluate training need and training effectiveness of nonprofessional hospital workers, who account for most of the employment in the medical services industry. The emphasis will be on those occupations for which the MDTA has trained the greatest number nationally - practical nurse, nurse's aide, and orderly. Training needs will be determined by examining the relationships among wage rates, necessary skills, sources of manpower supply, and occupational shortages. The evaluation of training effectiveness will be approached through cost-benefit analysis.

Franke, Walter H., University of Illinois, Institute of Labor and Industrial Relations, Champaign, Illinois. Training and Recruitment Problems for Selected Technical Occupations in Short Supply. Objectives and procedures: Severe occupational shortages exist in areas where there are also high levels of unemployment. Many of these shortages are in technical occupations requiring considerable training. This study is designed to provide understanding that will help achieve more rational adjustments to occupational changes. Six key technical occupations in which there are critical shortages of workers are being studied to determine the causes of these shortages and effectiveness of current job placement processes and institutions in removing or lessening the shortages. Studies are being undertaken in the St. Louis and Chicago metropolitan areas in the following occupations: Licensed practical nurses; medical technologists; tool and die makers; tool and die designers; engineering technicians; electronics; and engineering technicians, metal working.

Gee, Helen Hofer, Association of American Medical Colleges, 2530 Ridge Ave., Evanston, Illinois. Choice of Type of Career in Medicine. Problem: To study social and psychological factors underlying choice of type of career and specialty field of medicine.

Glaser, William A., School of Medicine, Western Reserve, Cleveland, Ohio. Attitudinal Changes of Students under the New Curriculum at Western Reserve Medical School. Problem: To study the changes in attitudes and values which take place in medical students as a result of the new curriculum at Western Reserve University, Cleveland Ohio, and to compare changes with those found in students who studied under the more conventional curriculum. 1959.

Jones, Jane Gaudette, The Florence Heller Graduate School for Advanced Studies in Social Welfare, Brandeis University, Waltham, Massachusetts. The Career Patterns of Women Physicians. Objectives and Procedures: The study will be concerned with identifying the factors which motivate women to enter the medical profession and the barriers which they must overcome in the pursuit of their goal. A sample of women students, dropouts, and graduates of the medical schools of Boston University, Tufts University, and Harvard University will be interviewed about their career decisions and about personal and professional career patterns. Key persons in medical education will also be interviewed, in order to delineate the role of women in medicine in the future.

Lurie, M., University of Rhode Island, Kingston, Rhode Island. State Medical Licensing Boards and the Supply of Physician's Services. 1966.

Pair, Nona Tiller, Western Interstate Commission for Higher Education, University East Campus, 30th Street, Boulder, Colorado. Investigation of Nursing Content in Baccalaureate Nursing Programs. Problem: To identify a core of nursing knowledge which should be shared with all student baccalaureate nursing programs. Project: A staff comprised of six persons selected from faculties of Western schools of nursing is working with the project director. Facilities of the thirty-five Western schools offering baccalaureate programs, selected nurse practitioners consultants from fields of education and health disciplines are participating. The design is based on the collection, through structured sampling, of case reports of certain recipients of nursing services, identification of their needs and nursing action indicated by those needs, and the knowledge basic to selection, initiation, and performance of these indicated nursing actions. 1966.

OMPER
Department of Labor

Related Projects

Alter, Henry C., National Education Television and Radio Center, New York, New York. Challenge for Modern Women. Objectives and Procedures: This contract makes available a series of programs for national distribution among educational television stations. The series is entitled "Choice Challenge for Modern Women". It was produced by the University of California Extension Service and consists of 12 half-hour programs on the wide range of career choices open to women. It is anticipated that broader dissemination of the information will promote fuller use of the nation's trained woman power. The films and a syllabus discussion guide to the series will be made available to the 105 stations affiliated with educational television at nominal cost.

Bergman, Ralph H. International Labor Organization. International Differences in Factors Affecting Labor Mobility - inter-industry, occupational, and geographical: selected countries of western Europe.

Bishop, Charles E., Department of Economics, North Carolina State University, Raleigh, North Carolina. Institutional Grant. Research Objectives: Investigators will study both manpower problems common to the whole country and those unique to the South. Research will be conducted on the labor market behavior of professionals and technicians, on the costs and benefits of retraining workers of different age groups and different skill levels, and on the economic effects of social welfare programs. Studies will try to determine the effect of changing technology on traditional industries on demand for labor, the degree to which skills are transferable from one occupation to another, and the effect of the growing urbanization of Negroes on their labor force participation. Developmental Activities: A Theoretically based, empirically-oriented program of graduate studies for Ph.D. students specializing in labor economics, human resource development, and manpower policy will be established. This program will culminate in a research workshop. It is expected that faculty members and graduate students at Duke University and the University of North Carolina will participate in the research workshop, both by attending sessions and by presenting papers.

Clark, David H., College of Business Administration, University of Maine, Orono, Maine. Institutional Grant. Research Objectives: The Project will entail construction of a model relating manpower underutilization in Maine to sources which cause it, such as community environment. An interdisciplinary research team will break down the community environment into the four sectors in which groups concentrate their activities - educational, economic, political, and social. The structure and values of each sector will be examined by scholars in the several disciplines. They will specify and measure causal relationships between sectors comprising community environment and underutilization of manpower. Results should be applicable to similar areas throughout the U.S. Developmental Activities: Because the project is interdisciplinary, faculty will profit from the contact with members in other fields by considering common problems from varied viewpoints. The project will serve as the training vehicle for both faculty and graduate students in manpower problems and social science research.

Davey, Harold W., Industrial Relations Center, Iowa State University, Ames, Iowa. Institutional Grant. Research Objectives: A multi-disciplinary group of scholars from the departments of psychology, sociology and economics will study human resource problems in the Great Plains States Region comprising the six states of Iowa, North Dakota, South Dakota, Nebraska, Kansas, and Missouri. Of highest priority will be studies leading toward the implementation of manpower programs as a part of a general economic development plan for the Great Plains States Region. Typical research will include occupational-employment projections for functional economic areas within the region, patterns of labor mobility from rural to urban areas, and employment opportunities and training facilities for women. Developmental activities: A Manpower Research Unit within the Industrial Relations Center will be established. This unit will have as its mission the development of a program of co-ordinated manpower research and graduate education for the institutions of higher education in the Great Plains States Region. A non-degree Summer Institute for scholars and advanced graduate students will be offered, as well as research assistantships to graduates of colleges and universities in the region. A clearinghouse of information on current research projects and manpower publications will be established.

Easterlin, Richard A. National Bureau of Economic Research, New York, New York. Labor Force Trends and Projections in the United States.

Folger, John K., National Science Foundation, Washington, D.C. Symposium on Manpower Theory. Objectives and Procedures: The symposium is designed to explore the usefulness of current theories of career choice, manpower supply and demand, and occupational and professional recruitment. Changes of substantial magnitude are anticipated in future demands for scientific and professional personnel, and the supply of persons with advanced education. The symposium will determine the value of current social science concepts in planning for the future demand and supply situation for highly educated manpower. The relevance of current theories to the structure of manpower policies and the design of manpower research will also be analyzed.

Gadson, James H., Departments of Economics, Sociology, and Psychology, Virginia State College at Norfolk, Norfolk, Virginia. Institutional Grant. Research Objectives: Scholars from the various disciplines of the College will be organized into an interdisciplinary manpower research team. The group will examine manpower losses resulting from underutilization of human resources in the Tidewater Area of Virginia, and determine to what extent remedial programs can be devised to remedy this problem. Developmental Activities: A Manpower Utilization Institute will be established. The Institute will offer undergraduates in the social sciences training in laboratory techniques which are usually available only to graduate students at large universities. Institute studies will offer a framework within which to orient individual study by students who are required to do a senior research project. New courses structured around the findings of the proposed study will be added to the curriculum, and courses relating to manpower utilization will be increased at the Evening College. The Institute will also encourage research by faculty members seeking advanced degrees.

Ginzberg, Eli, Columbia University, New York, New York. Manpower Resources and Economic Growth. Objectives and Procedures: The objective of this continuing series of studies is to identify and analyze various economic sectors in order to determine the role of manpower resources in the expansion of the economy. Highlights of Findings: "Manpower Resources and Nuclear Power" emphasizes the crucial role of highly qualified personnel in the development of a new technology, and the critical role of government in providing appropriate personnel in the early developmental period of activity. Failure to secure an adequate core of such personnel could result in excessively high costs of development. "The Expansion of Producers' Services" points out the growing tendency of employers to reduce their regular manpower requirements by contracting for such services. The report discusses the growth of the producers' services sector and the factors contributing to its rise. It examines the nature of its labor force, including such factors as sex, and race, occupational characteristics, range of educational attainment and earnings.

Gordon, R. A., Berkeley Research Program on Unemployment and the American Economy, University of California, Berkeley, California. Conference on Methods of Projecting Manpower Supply and Demand. Objectives and Procedures: The conference brought together individuals inside and outside of government concerned with the development of methodology for labor force projections and with actual application of the methodology. Some 40 representatives of the Departments of Labor, Commerce, Agriculture, and Defense, the Council of Economic Advisors, the Bureau of the Budget, NSF, the Federal Reserve System, the Senate Committee on Employment and Manpower, the Brookings Institution, and 11 colleges and universities considered current techniques and methods for improving these procedures, and made recommendations for achieving more accurate forecasting of labor supply and demand, by occupation and industry.

Green, Alfred L., Bureau of Employment Security, U.S. Department of Labor, Washington, D.C. Role of the Employment Service in Selected Western European Countries in Implementing an Active Manpower Policy. Objectives and Procedures: The role and effectiveness of the employment services in western European countries (France, Germany, Great Britain, the Netherlands, and Sweden) in the implementation of an active manpower policy are being studied. Information was secured through interviews with employment service and related officials in Europe during the summer of 1966. The administrative and operational aspects of national employment services which contribute to active manpower policies were emphasized in the interviews.

Haurek, Edward W., Department of Sociology, University of Illinois, Urbana, Illinois. Sociological Determinants of College Curriculum Choice, and Occupational Aspiration Among Working Class Adolescents. Objectives and Procedures: The objective of this study is to test the hypothesis that the environment of working class adolescents causes them to differ from middle-class children in value placed on a college education and in the choice of occupation. Data from Project TALENT will be used to compare values and characteristics of middle-class and working class adolescents. Statistical techniques will be utilized in comparison of aspirations, achievements, aptitudes, relationships with fellow students, degree of parental supervision, occupational choices, and motivations for college attendance.

Hiestand, D. L., Russell Sage Foundation, Study in progress at Columbia University, New York, New York. Changing Careers in Middle Years. 1966.

Ihnen, Loren and Carroll, Adger B., North Carolina State University at Raleigh, Raleigh, North Carolina. The Costs and Returns of Industrial Education: a pilot study. Objectives and procedures: This pilot project will test the feasibility of a new method of measuring the costs and returns of investment in industrial education. As technological innovations are adopted, industrial education becomes more complex. The method to be tested in this study will develop estimates of costs and returns through the control and measurement of a greater number of related variables than have been treated in previous published studies of this nature. The estimates to be developed and tested will be based on data acquired through personal interview with three sources: 1) the educational expenditures and monthly income histories of a sample of North Carolina industrial school graduates; 2) the monthly income histories of a similar-sized sample of North Carolina high school graduates; and 3) records maintained by school officials for estimating private cash outlays - including earnings foregone while in school - public costs. 1965.

Keyserling, Mary Dublin, Women's Bureau, U.S. Department of Labor, Washington, D.C. Employment Opportunities for Women in Subprofessional Professions. Objectives and Procedures: Subprofessional occupations which offer employment opportunities for women are to be studied. Attention will focus on the growing number of technician occupations, as well as on such jobs as teachers' aides, social workers' aides, and library assistants, which require 2 or more years of education beyond high school. The study will furnish information on educational and skill requirements, job duties, and earnings.

Klos, Joseph J., Roney, Maurice W., Scofield, Robert W., Sutker, Solomon and Tarver, James D., Oklahoma State University, Stillwater, Oklahoma. Institutional Grant. Research Objectives: Specific areas of research will be evolved after establishment of the program. A steering committee composed of one staff member from each of the Department of Sociology, Economics, Industrial Education and Psychology will stimulate and coordinate University manpower research. Developmental Activities: A Manpower Research Center will be established to administer the curriculum for manpower trainees and to coordinate University manpower research. Manpower specialists will be trained in a two-year program which will lead to an M.S. degree.

Lecht, Leonard, National Planning Association, Washington, D.C. Manpower needs for National Objectives in the 1970's. Objectives and Procedures; This project is based on an earlier phase of the National Planning Association's Goals Project which estimated the private and public costs of pursuing national objectives in the 1970's. The primary objective of the present study is to develop projections of manpower requirements by occupation for 1975 for the achievement of national objectives in education, health, housing, space, plant and equipment, and other areas. Manpower projections are being prepared for the major occupational groups and for the occupations within each group for some 30 economic sectors. While many significant projections of manpower needs already have been made for the next decade, a distinctive element in the present work is that it will offer a frame work for relating occupational requirements to national objectives from which overlapping implications relative to the gross national product have been removed.

Parkhurst, Kenneth L., Northern Michigan University, Marquette, Michigan. Formulation of a Regional Manpower Development Program for the Upper Peninsula of Michigan. Objectives and procedures: Develop, demonstrate and evaluate techniques and procedures for the construction of a regional manpower program which may serve as a model for other regions with similar problems. Study will identify regional manpower demands for future economic growth for the years 1970 and 1975 in relation to independently developed economic projections for the UP of Michigan. Among the factors to be studied are the effects of migration, demographic data and the proportion of the population expected to seek employment. 1965.

Reder, Melvin W., Department of Economics, Stanford University, Stanford California. International Differences in Unemployment Rates of New Entrants to the Labor Force. Objectives and Procedures: This project will consider the question of how a number of Western European countries have been able to maintain rates of unemployment consistently and appreciably lower than those of the United States over the past decade. The researcher will attempt to measure the relative importance of the lower unemployment rates of young people and recent immigrants in explaining overall differences in unemployment rates, to analyze the causes of these differences and to appraise their relative importance and to consider the implications of the analysis for public policy. Using unemployment data for recent labor force entrants in the United States and in several Western European countries, conventional econometric techniques will be exercised to relate international and regional differences in the rates to differences in relevant economic structures and institutions.

Stein, Bruno, New York University, New York, New York. Local Manpower Data Programs. Objectives and Procedures: This study concerned the needs of State and local areas for manpower data in policy and program planning. Its objective was to facilitate the development and use of local manpower data by providing perspective on the adequacy of different kinds of data now prepared and published by various State and local areas. It considered the nature and uses of various types of data, and the possible sources and techniques which could be used in gathering more accurate data. A wide variety of State and local publications which present manpower data were analyzed. Sources and techniques used to develop the data, the limitations of the data, and the intended uses of results were examined.

Sweet, James A., Department of Sociology, University of Michigan, Ann Arbor, Michigan. Family Composition and the Labor Force Participation of Married

Women. Objectives and Procedures: This study will examine the influence of family composition on the labor force activities of married women in the United States. The presence of children in the household, and their ages will be major variable studied. Other factors, including characteristics of the women, e.g., their age, race, education, place or origin, and characteristics of their husbands and families, e.g., husband's income and employment status, will be utilized as controls, and interactions between them and household composition variables will be examined. Data from the U.S. Bureau of the Census, largely from the 1/1000 sample tape from the 1960 Census of Population, will be used. Multivariate statistical methods will be employed for analysis.

Young, Harding B. Atlanta University, Atlanta, Georgia. Graduate School of Business Administration. Institutional Grant. Research Objectives: Analysts will study changes in jobs caused by new technology in order to design programs which will equip the long-term unemployed and other unemployed with the necessary skills and attitudes for successful employment. Particular emphasis will be placed on the problems of Negro workers. Developmental Activities: The University will develop the facilities necessary for long-term manpower research. It will encourage study by faculty members with an interest in labor problems, acquire necessary reference materials and equipment, and train students for careers in the manpower field.

Agency for International Development

Taylor, Karl, Johns Hopkins University, Baltimore, Maryland. Research in Health Manpower Planning for Selected Less-Developed Countries. The objectives of the study are to determine the magnitude of the gap between the present and potential supply and demand for health manpower in selected countries at different stages of development, and to test various methods of alleviating the shortages - among them, greater use of auxiliary personnel.

Bureau of Public Health Economics

Hansen, W. L., University of Michigan, Ann Arbor, Michigan. Shortages and Investment in the Economics of Health and Medical Care, proceedings of the conference on the economics of health and medical care, May 10-12, 1962. 1964.

California State Department of Mental Hygiene

Blumberg, Mark S., Stanford Research Institute, Menlo Park, California. Forecasting Psychiatric bed needs in California. Project: Analysis of data on admissions to state mental hospitals, with development of a multiple regression model based on county differences in 1961. Analysis of the time trends in admissions to all psychiatric facilities in California. Analysis of the experience of a sample with psychiatric benefits of health insurance in California.

Klutch, Murray, Callahan, Patricia and Wood, Donald, Bureau of Planning, California State Department of Mental Hygiene, 1500 Fifth St., Sacramento, California. Problem: To develop an interpretative bibliography relating to methods of relieving current and future mental health manpower shortages in the four core groups of psychiatric personnel, based upon studies in the field and drawing upon the experiences of other disciplines and professions. Project: (a) A mail questionaire to experts in the field of mental health and in other professions; (b) A mail questionaire to a representative sample of psychiatrists in the State of California; and (c) A review of the pertinent literature. Final report due fall of 1964.

Institute for Advancement of Medical Communication

Boek, Walter E., Institute for the Advancement of Medical Communication, 33 E. 68th Street, New York, New York. Problem: To review all research on the flow of information from medical educators and scientists to practitioners in terms of the reliability of methods used in carrying it out, and to suggest research and research procedures that are needed to obtain data necessary to improve continuing medical education. Project: All studies, both restricted and published, that can be obtained will be reviewed.

National Academy of Science

Hansen, W. Lee and Howard Tuckerman. University of Wisconsin, Department of Industrial Relations, Madison, Wisconsin. The study is a survey of available literature on the supply and demand for scientific manpower. As part of the work of the Commission on Human Resources and Advanced Education it will indicate areas in which research is needed. The Commission is sponsored by four private nonprofit organizations and is administered by the National Academy of Scineces.

Vocational Rehabilitation Administration
Department of Health, Education, and Welfare

Rusk, Howard A. Institute of Physical Medicine and Rehabilitation, 400 E. 34th Street, New York, New York. Rehabilitation Research and Training Center. Problem: Research in the physical, emotional, social, and vocational aspects of rehabilitation of the handicapped and the training of professional personnel in rehabilitation. Project begun: Sept. 1961.

Sponsor Not Identified

Health Manpower Projects

Association of American Medical Colleges, 2530 Ridge Avenue, Evanston, Illinois. A Study of the Relationships Among 30 Criteria of Performance in Medical School. Problem: To describe the dimensions of medical school performance as measured by Part I of the National Board of Examination, a peer evaluation instrument administered at the end of the second year in medical school, and freshman and sophomore medical school grades.

Association of American Medical Colleges, 2530 Ridge Avenue, Evanston, Illinois. Selection of Specific Personality Types by Medical School Admissions Committees. Problem: A study of the extent to which measurable personality characteristics are employed by admissions committees in selecting students.

Boek, Walter E., New York Institute for Advancement of Medical Communication. A study of Postgraduate Instruction for Practitioners. Problem: (1) How to increase the proportion of physicians participating in postgraduate instructional programs of various organizations. (2) How to increase the effectiveness of these teaching efforts in terms of imparting information more efficiently, fostering basic understanding of health and disease more successfully, and offering better opportunities for cultivation of skills and judgment.

Bottone, S., School of Public Health and Administrative Medicine, Columbia University. The Professional Association and Collective Bargaining: The American Nurses' Association Experience. 1966.

Boyd, Isabel, Director of Economic Research, Canadian Dental Association, 234 St. George Street, Toronto, Ontario, Canada. Survey of Recent Dental Graduates. Problem: To collect information from recent graduates in dentistry on: the relationship of place of origin to location of practice and factors influencing the choice of practice location; the cost of dental education and of establishing a practice and the source of funds expended; the percentage of practice and time devoted to each field of dentistry; the changes made in techniques and treatment procedures since graduation and the persons or means influential in making these changes; the DMF rate of the dentists' children and the caries-control steps dentists' children use.

Community Council of Greater New York, 345 E. 45th Street, New York, New York. Salaries and Related Personnel Practices in Voluntary Social and Health Agencies in New York City: September, 1962. Problem: To determine the salaries currently paid for specified jobs in social health and welfare agencies. Among the 44 positions studied are Caseworkers, Casework Supervisors, Clinical, Practical and Visiting Nurses, Clinical Psychologists, Directors of Hospital Social Service Departments, and Program Directors in group work and recreation, and other supervisory, and clerical positions.

Community Systems Foundation, Ann Arbor, Michigan. Nursing Service Staffing and Scheduling Requirements for Medical-Surgical Unit, Blodgett Memorial Hospital. Project GRBL 4 Community Systems Foundation. 1964.

Dubin, Samuel S. and Marlow, H. Leroy, Pennsylvania State University, University Park, Pennsylvania. A Survey on the Determination of Training Needs in Pennsylvania Hospitals. The objectives of the study were (1) To determine present and long-range training needs of administrative, supervisory, and other hospital personnel, and (2) To recommend methods for providing continuing professional education for updating hospital personnel. The data were obtained by written questionaires and interviews. 1965.

Durbin, Richard L., Graduate Program of Hospital Administration, University of Chicago, 950 E. 59th Street, Chicago, Illinois. The Effect of Availability of Hospital Facilities on Physician Supply.

Fein, Rashi, Johns Hopkins University, Baltimore, Maryland. Factors Influencing the Location of North Carolina General Medical Practitioners: A Study in Physician Distribution. 1956.

Feldstein, Paul J., Division of Research, American Hospital Association. Study of Personnel Turnover. Problem: Turnover among the 1,700,000 persons working in hospitals is a costly factor in both money and in quality of patient care. Basic data are needed to attack the problem. 1963.

Flitter, Hessel H., Research and Studies Service, National League for Nursing, 10 Columbus Circle, New York, New York. Developing a Programmed Unit of Instruction in Rehabilitation Nursing.

Flitter, Hessel H., Research and Studies Service, National League for Nursing, 10 Columbus Circle, New York, New York. Study on Cost of Nursing Education.

Folk, H. and D. E. Yett, Washington University, St. Louis, Missouri. Methods of Estimating Occupational Attrition. 1965.

Foreman, Alice and Deushle, Kurt, 615 N. Wolfe Street, Baltimore, Maryland. Comparative Health Manpower - Turkey Study. Division of International Health, Johns Hopkins University, Agency for International Development, Washington, D.C.

Fowler, Manet, Research Director, Evaluative Study, New York State Department of Health, Room 264, 84 Holland Avenue, Albany, New York. Public Health Physician-Training and Image of Public Health Practice: Evaluative Results. Problem: To complete a series of publications, selectively designed to demonstrate the results of seeking evaluative criteria for public health physicians' training, aspects of school of public health M.D. education, preceptor-trainee relationships during residencies, and professional image. 1961.

Hall, James Herrick, Southern Illinois University, Carbondale, Illinois. Identification and Indexed Topical Analysis of Research Related to Rehabilitation Counselor Education, 1955 through 1958. Problem: The basic purpose of this project is to continue the search of literature for the 1947-56 period and to bring the search and the reports up December 31, 1958.

Hamilton, James A., Program in Hospital Administration, School of Public Health, University of Minnesota, Minneapolis, Minnesota. Research on the Training of Hospital Administrators.

Hart, Peter Fenley, School of Hygiene, University of Toronto, Toronto, Ontario. An Analysis of the Sickness Absence Among Employees of a Children's Hospital.

Hawkins, James L., Purdue University, Lafayette, Indiana. The Ward Manager System: A Case Study of the Organization of Hospital Nursing Care. June 1964.

Hepner, James O., Graduate Program of Hospital and Health Administration, College of Medicine and Graduate College, State University of Iowa, Iowa City, Iowa. Study of Attitudes toward Financial Support of Hospital Programs for Graduate Medical Schools.

Hill, Lawrence A., Bureau of Hospital Administration, University of Michigan, Ann Arbor, Michigan. Cost of Nursing Education in Hospitals.

Holen, Arlene S., Columbia University, New York, New York. 1962. Effect of State Licensing Arrangements in Five Professions on Interstate Labor Mobility and Resource Allocations. 1962

Hunt, Gerald J., University of North Carolina. Institute for Research in Social Sciences, Chapel Hill North Carolina. Distribution and Utilization of Mental Health Manpower in North Carolina. This is a study of the location, places of employment, training, and career plans of North Carolina's mental health manpower; Psychiatrists, psychologists, nurses, general physicians, and social workers. Information is being obtained through questionaires and interviewing of limited subsamples.

Jelinek, Richard C., Department of Industrial Engineering, University of Michigan, Ann Arbor, Michigan. Nursing; the Development of an Activity Model. 1964.

Kahler, Carol, St. Louis University, St. Louis, Missouri. Project for experimental Curriculum in Health Organization Research.

Keiser, Kay A., The Program in Hospital Administration, Yale University, New Haven, Connecticut. A Quantitative Analysis of the Quality of Medical Care Given by Two Different Medical Resident Staffs in a City Hospital. 1962.

Kennedy, Charles L., Bureau of Hospital Administration, University of Michigan, Ann Arbor, Michigan. A Study of the Effect of the Organization of Nursing Hours on Direct Patient Care and Productive Activity on a Nursing Unit.

Kincaid, Harry V., Behavioral Sciences Research Program, Stanford Research Institute, 333 Ravenswood Avenue, Menlo Park, California. The Applications of Programmed Instructional Techniques to Under-Graduate and Post-Graduate Dental Education. Problem: To determine the cost and benefits to be derived from the application of programmed instructional techniques to certain aspects of dental education, both undergraduate and postgraduate. For purposes of the first phase of work, the general area of oral histology has been selected. Within this broad subject-matter area, material of the periodontal ligament has been programmed for undergraduates. Plans are to try out for post-graduate refresher courses in clinical periodontology. 1962.

Kurtz, Richard A. and Sathoff, Donald E., University of Nebraska, Lincoln, Nebraska. Functional Analysis - A Study of Function Performance by Personnel in Seven Small Hospitals. December, 1961.

Lamb, James A., Program in Hospital Administration, Duke University, Durham, North Carolina. A Profile Study of the Staff Nurse in Medium Size Hospitals in North Carolina.

Levine, Eugene, Belcher, Helen, and Taira, Joy, Statistics and Analysis Branch, Division of Nursing, Bureau of State Services, Public Health Service, U.S. Department of Health, Education and Welfare, Washington, D.C. Study of Educational Preparation and Educational Needs of Professional Nurses.

McLemore, S. Dale and Hill, Richard J., Bureau of Business Research, The University of Texas, Austin, Texas. Management-Training Effectiveness - A Study of Nurse Managers. 1965

Michaels, Robert G. and Nelson, Roberta J., Program in Hospital Administrtion, School of Public Health, University of Minnesota, Minneapolis, Minn. The Use of Work Teams in Hospital Housekeeping Departments. 1963.

Miller, R. L., University of Pennsylvania, Philadelphia, Pennsylvania. An Analysis of the 1965 Cooper Hospital Strike. 1965

Miller, R. L, University of Pennsylvania, Philadelphia, Pennsylvania. Employee Relations in Hospitals. 1966.

Mills, D., University of Alberta at Calgary, Department of Sociology, Calgary, Alberta, Canada. A Study of Three Canadian Healing Arts Professions (Chiropractic, Osteopathy, and Naturopathy.)

Moen, B. Duane, Bureau of Economics Research and Statistics, American Dental Association. The 1959 Survey of Dental Practice. Problem: To determine trends in dental practice, such as auxiliary personnel employed number of patients, income and expenses. A special purpose of this survey is to obtain statistics on dental patients and dental services provided. 1960.

Moon, Marjorie, and Slack, Kathleen M., The Institute for Medical Social Workers, 42 Bedford Square, London W.C.1, England. The First Two Years - A Study of the Work Experience of Some Newly Qualified Medical Social Workers. 1962

Nelson, Edmund K., Program in Hospital Administration, University of Minnesota, Minneapolis, Minnesota. Pilot Study to Correlate Nursing Time Requirements with Degrees of Illness of Nursing Home Patients.

New, Peter Kong-ming, Department of Public Health Practice, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pennsylvania. A Pilot Study on the Career Patterns of Hospital Administrators.

Nichols, David C., University of Michigan, Ann Arbor, Michigan. A Comparative Study of the Performance of Foothill College School of Nursing Graduates Verses Diploma and Baccalaureate Graduates Working at El Camino Hospital. 1966

Powell, Frances L. A., Nursing Service and Nursing Education, Cook Co. School of Nursing, 1900 W. Polk St., Chicago, Illinois. A Study to Determine the Staffing Needs of a Nursing Unit and Optimum Utilization of Nursing Service Personnel.

Reder, Melvin W., Stanford University, Department of Economics, Stanford, California. Supply and Demand for Medical Personnel. This project will make projections of the demand for various types of medical personnel and will attempt to estimate the probability of meeting the various requirements for such personnel under specific circumstances. 1967.

Robertson, Alexander, Department of Social and Preventive Medicine, University of Saskatchewan. Evaluation of Academic Success of Medical Students, University of Saskatchewan. Problem: Answers to two questions are being sought: (1) What factors enter into the selection or rejection of medical students?; (2) Can the success or failure of medical students be predicted.

Scofield, Carleton F., Center for Applied Social Research, New York University, Washington Square, New York, New York. A Pilot Study of the Nature and Extent of the Medical Profession's Uncompensated Activities. Problem: In order to provide information for the development of an interview guide for a national survey, the problem of the pilot study is to ascertain: (1) the range of meanings given by physicians to the terms "compensated" and "uncompensated" services: and (2) the nature and limits of information obtainable in such interviews with physicians. 1960.

Seale, J. R., Institute of Economic Affairs. Medical Emigration: A Study in the Inadequacy of Official Statistics. 1965.

Straughn, Herbert E., University of Pittsburgh, Pittsburgh, Pennsylvania. A Study of the Inservice Training Program for Specialized Medical Technician and the Post Military Employment of these Technicians. 1965.

Tresnowski, Bernard R., Bureau of Hospital Administration, Graduate School of Business Administration, University of Michigan, Ann Arbor, Michigan A Study of Social and Economic Factors Influencing Surgical Practice in the United States. 1963.

Weiss, J. H., Harvard University, Cambridge, Mass. The Changing Job Structure of Health Manpower. 1966.

Werneke, Robert, University of Wisconsin Hospitals, Madison, Wisconsin. Work Sampling in the Hospital: A Study of the Orderly Service. 1963.

Sponsor Not Identified

Related Projects

Aronson, Robert L., School of Industrial and Labor Relations, Department of Labor Economics and Income Security, Cornell University, Ithaca, New York. The study of Labor Markets for Highly Talented Manpower will emphasize manpower allocation and utilization. It will include an attempt to determine the extent to which labor market efficiency explains the relatively low unemployment rates among high-talent manpower. An effort is being made to explore the availability and usefulness of data sources such as census occupational and scientific manpower.

Auster, R., I. Levenson, and D. Sarachek, National Bureau of Economic Research, New York, New York. The Production of Health, an Exploratory Study. 1966.

Blumberg, M. S., Stanford Research Institute, Menlo Park, California. Factors Relating to Demand for Psychiatric Services in California. 1965.

Dryden, Myles Muir, Graduate School of Business and Public Administration, McGraw Hall, Cornell University, Ithaca, New York. The Economics of General Hospitals with Emphasis on Hospital Costs. Sept. 1959-Feb. 1961.

Eilers, R. D., University of Pennsylvania, Philadelphia, Pennsylvania. Cost Control and Medical Care. 1966

Feldstein, Paul J., Graduate Program of Hospital Administration, University of Chicago, Chicago, Illinois. An Empirical Investigation of the Marginal Cost of Hospital Services. 1961.

Gibbons, William J., Fordham University, Department of Economics, New York, New York. This report will be divided into two parts. Part I will focus on the scientific and engineering manpower resources for each member country of the United Nations and some non-member countries. Data will include the current total inventory of scientists and engineers, numbers of enrollments and graduations, and breakdowns by individual scientific and engineering disciplines. Part II will consist of an evaluation of broad worldwide trends and developments in the training of scientists and engineers and will correlate inventory data with demographic factors of total population, size of labor force, number of professional trained personnel, etc.

Kendrick, John W. and Jennifer Rowley. University of Connecticut, Department of Economics, Storrs, Connecticut. This study will assemble and prepare estimates for all forms of investment in the United States from 1929 to 1964, including research and development and investment in human beings, as well as tangible business, household and public investment, by major sectors and types. The relationships with national and sector incomes and economic growth will be analyzed.

Levin, Lowell Stern, 901 Jonas Salk Hall, University of Pittsubrgh, Pittsburgh, Pennsylvania. Federation of American Societies for Experimental Biology. Study of Manpower Needs in the Basic Health Sciences.

McCaffree, K. M., University of Washington, Seattle, Washington. Methodology of Economics and the Economics of Mental Health. 1966

McNerney, Walter J., University of Michigan, Ann Arbor, Michigan. Study of Hospital and Medical Economics. Problem: A study of hospitals and allied institutions prepayment and insurance agencies, health manpower and the population with particular reference to costs, utilization, benefits, gaps, effectiveness of operation, needs and controls. 1960.

Montgomery, Joel O., Medical College of Virginia. Hospital Administrative Research. 1964

Parnes, Herbert S., and Kelly, S. C. Jr., Ohio State University, Division of Research, Human Development and Educational Planning Project, Columbus, Ohio. The Preparation and Deployment of High-Level Manpower. The main objectives of the project are: (1) To measure and describe the existing allocation of deployment of high-level personnel, (2) To develop criteria against which this deployment can be evaluated, (3) To assess the primary factors affecting the allocation of highly-trained manpower, and (4) To identify the policy mechanism for inducing a more optimal deployment. Exploratory work is now in progress, and several case studies are being developed on the preparation and deployment of professional technical, and managerial personnel in the United States and Canada. Detailed information on the educational backgrounds and employment histories of samples of these personnel is being collected by personal interview and questionaire. Samples have been drawn from both graduates of relevant educational institutions and persons performing relevant job functions in establishments in several important industrial sectors. 1965.

Pundeff, Marvin V., San Fernando Valley State College, Department of History, Northridge, California. Science and Engineering Manpower Resources in Eastern Europe. This study will investigate the supply, demand, utilization, employment, and education of scientific and engineering manpower at the level of higher professional education and, where possible, at the technician level of training in the eight Eastern European Communist counrties. It will attempt to delineate the import of Soviet influence in the areas of education, science organization, and economic control. The correlation between economic development and factors of education, planning, and centralized economic control will also be analysed.

Robertson, Robert L., Department of Economics and Sociology, Mount Holyoke College, South Hadley, Massachusetts. Pilot Study of Economics Returns from Health Services.

Stieber, Jack, School of Labor and Industrial Relations, Michigan State University, East Lansing, Michigan. Manpower Adjustments to Automation and Technological Change in Western Europe. This is a study of manpower policies and programs in Great Britain, the Netherlands, France, West Germany and Sweden to determine the kinds of problems that arise under conditions of full employment and the policies developed to deal with them. Representatives of government, business, labor, and the university were interviewed in each country and a survey was made of available literature on the subject. 1965.

Warner, Aaron, W., Columbia University, Seminar on Technology and Social Change, New York, New York. Pilot Study of Obsolescence of Scientific and Engineering Skills. The principal objectives of the project are: (1) to determine the problems of identifying the process of skill obsolescence among scientists and engineers in approximately 40 selected employing organizations, identify the areas which need investigation, and develop pilot techniques for assessing the extent and nature of the problem, and (2) to probe into methods that may be used to obtain information concerning the staffing and operational problems which skill obsolescence poses for research and engineering managers.

Wellin, Edward, American Public Health Association, 1790 Broadway, New York, New York. Study in Behavioral Sciences in Public Health.

Wilson, James A., Graduate School of Business, University of Pittsburgh, Pittsburgh, Pennsylvania. Migration of British Scientists to North America. This continuing research involves the social psychology of emigration, and specifically, the migration of British scientists and other professionals to North American during the last decade. A longitudinal follow-up of a core-sample of migrants is being planned and thought is being given to a second-level research effort on the question of migrant personality among migrant British scientists and matched nonmigrant controls. Begun 1964.

SECTION FOUR

REGISTRY OF PERSONS ACTIVE IN HEALTH MANPOWER RESEARCH

In this section of the report, we have listed some of the people who have been actively engaged in research relevant to health manpower. In compiling this list we gathered names from our bibliographic file and from lists of projects and conferences. While this list contains many names, there are undoubtedly many researchers who have been overlooked simply because their work has not been brought to our attention.

This registry has been arranged both by area of interest and location. In determining the area of interest, we listed researchers according to the papers they have written. When a researcher had written in several areas, however, we placed him in a more general category which includes the various areas. The location list does not include everybody on this first list since we were unable to find the current location of some of the researchers.

I. HEALTH ECONOMICS

Brian Abel-Smith
London School of Economics
London, England

Kenneth J. Arrow
Department of Economics
Stanford University
Stanford, California

Richard Auster
National Bureau of
Economics Research
New York, New York

Robin Barlow
Department of Economics
University of Michigan
Ann Arbor, Michigan

Monro Berkowitz
Department of Economics
Rutgers University
New Brunswick, New Jersey

Charles H. Berry
Princeton University
Princeton, New Jersey

Ralph Berry
Department of Economics
Harvard University
Cambridge, Mass.

Mark S. Blumberg
University of California
Office of the Vice President
Berkeley, California

W. John Carr
Graduate School of
Public Administration
Harvard University
Cambridge, Mass.

A. J. Carroll
Association of American
Medical Colleges
Evanston, Illinois

Harold A. Cohen
Department of Economics
Cornell University
Ithaca, New York

Ronald W. Conely
National Institute of
Mental Health
Washington, D.C.

Martin David
Department of Economics
University of Wisconsin
Madison, Wisconsin

Myles Muir Dryden
Graduate School of Business
and Public Administration
Cornell University

M.S. Feldstein
Nuffield College
Oxford, England

V. R. Fuchs
National Bureau of
Economics Research
New York, New York

Joseph W. Garbarino
School of Business Administration
University of California
Berkeley, California

Jeremiah J. German
School of Public Health
Johns Hopkins University

Harry I. Greenfield
Queens College
New York, New York

Ruth S. Hanft
Social Security Administration
Department of Health, Education
and Welfare
Washington, D.C.

I. Health Economics cont'd.

Samuel B. Hinchey
University of Missouri
Columbia, Missouri

Reuben A. Kessel
School of Business
University of Chicago
Chicago, Illinois

Herbert E. Klarman
Johns Hopkins University
Baltimore, Maryland

Robert E. Kuenne
Princeton University
Princeton, New Jersey

I. M. Labovitz
Library of Congress
Legislative Reference Service
Washington, D.C.

Howard Laitin
Hughes Aircraft Co.
California

Robert J. Lampman
University of Wisconsin
Madison, Wisconsin

Mary L. Larmore
Northwestern University
Evanston, Illinois

Irving Levenson
National Bureau of
Economics Research
New York, New York

Clem C. Linnenberg
U.S. Public Health Service
Washington, D.C.

Millard Long
University of Chicago
Chicago, Illinois

K. M. McCaffree
University of Washington
Seattle, Washington

Walter J. McNerney
Blue Cross
Chicago, Illinois

George N. Monsma
Princeton University
Princeton, New Jersey

James N. Morgan
University of Michigan
Ann Arbor, Michigan

Iwao M. Moriyama
U.S. Public Health Service
Washington, D.C.

Charlotte Muller
Columbia University
New York, New York

Selma J. Mushkin
Council of State Government
Washington, D.C.

Roy Penchansky
University of Michigan
Ann Arbor, Michigan

Mark Perlman
Economics Department
University of Pittsburgh
Pittsburgh, Pa.

Nora Piore
Urban Medical Economics
Research Project
50 Worth Street
New York, New York

Nancy Ribak
California Department of
Public Health

I. Health Economics
cont'd.

Dorothy Rice
Social Security Administration
Washington, D.C.

Kong Kyun Ro
Blue Cross of Western
Pennsylvania
Pittsburgh, Pennsylvania

C. Rufus Rorem
Hospital Review and Planning
Center of Southern New York
New York, N[illegible] York

Gerald Rosenthal
Department of Economics
Harvard University
Cambridge, Mass.

Jerry Rothenberg
Department of Economics
Northwestern University
Evanston, Illinois

T. Donald Rucker
Social Security Administration
Washington, D.C.

A. Peter Ruderman
World Health Organization

Dr. Paul Russell
World Health Organization

Dr. Walter Salant
Brookings Institution
Washington, D.C.

Deborah Sarachek
University of Pittsburgh
Pittsburgh, Pennsylvania

Jerry Schneider
Regional Science Institute
2440 Bancroft Way
Berkeley, California

Anne A. Scitovsky
Palo Alto Medical Research
Foundation
Palo Alto, California

John H. Simons
Institute of Industrial Relations
University of California
Berkeley, California

Herman M. Somers
Woodrow Wilson School of Public
and International Affairs
Princeton University
Princeton, New Jersey

Carl Stevens
Reed College
Portland, Oregon

Hugh D. Walker
Department of Economics
University of Indiana
Bloomington, Indiana

Burton A. Weisbrod
Department of Economics
University of Wisconsin
Madison, Wisconsin

II - 1. MANPOWER GENERAL

M. C. Alexander-Frutchi
Stanford Research Institute
Menlo Park, California

Henry C. Alter
National Educational Television
and Radio Center
New York, New York

Robert L. Aronson
School of Industrial and
Labor Relations
Department of Labor Economics
and Income Security
Cornell University
Ithaca, New York

Alexander Astin
American Council on Education
Washington, D.C.

Ralph H. Bergmann
International Labor Organization
Geneva, Switzerland

Charles E. Bishop
Department of Economics
North Carolina State University
Raleigh, North Carolina

David S. Blank
National Bureau of
Economics Research
New York, New York

Gary S. Becker
Department of Economics
Columbia University
New York, New York

M. Blaug
Institute of Education
London University
London, England

Kenneth E. Boulding
Department of Economics
University of Michigan
Ann Arbor, Michigan

William Bowen
Princeton University
Princeton, New Jersey

Mary Jean Bowman
Department of Economics
University of Chicago
Chicago, Illinois

Harvey E. Brazer
University of Michigan
Department of Economics
Ann Arbor, Michigan

Wallace R. Brode

J. D. Brown
Department of Economics and
Sociology
Princeton University
Princeton, New Jersey

Adger B. Carroll
Agricultural Economics Department
North Carolina State University
Raleigh, North Carolina

David H. Clark
College of Business Administration
Orono, Maine

Montague Cobb

William L. Copeland
Commission of Labor Statistics
U. S. Department of Labor
Washington, D.C. 20225

Andrew Daniere
Harvard University
Cambridge, Mass.

Harold W. Davey
Industrial Relations Center
Iowa State University
Ames, Iowa

Henry David

Nicholas De Witt
Departments of Economics and
Government
Indiana University
Bloomington, Indiana

II - 1. Manpower General cont'd.

H. M. Douty
Bureau of Labor Statistics
Washington, D.C.

J. T. Dunlop
Department of Economics
Harvard University

Floyd Durham
Department of Economics
Texas Christian University
Fort Worth, Texas

Richard A. Easterlin
National Bureau of Economics
Research
New York, New York

Solomon Fabricant
National Bureau of
Economics Research
New York, New York

Robert Ferber
University of Illinois

John K. Folger
Commission on Human Resources
and Advanced Education
Washington, D.C.

Hugh Folk
University of Illinois
Urbana, Illinois

Neil Ford
University of Illinois
Urbana, Illinois

Walter H. Franke
University of Illinois
Institute of Labor and
Industrial Relations
Champaign, Illinois

James H. Gadson
Departments of Economics,
Sociology and Psychology
Virginia State College
Norfolk, Virginia

Kailas C. Doctor

William J. Gibbons
Department of Economics
Fordham University
New York, New York

Eli Ginzberg
Conservation of Human
Resources Center
Columbia University

Abraham Gitlow
New York University

R. A. Gordon
Berkely Research Program on Unemployment
and the American Economy
Berkely, California

Warren S. Gramm
University of California
Davis, California

Alfred L. Green
Bureau of Employment Security
U. S. Department of Labor
Washington, D. C.

Frederick Harbison
Princeton University
Princeton, New Jersey

Einer Hardin
School of Labor and Industrial
Relations
Michigan State
East Lansing, Michigan

N. E. Harris
American Association of
Junior Colleges
Washington, D.C.

Edward W. Haurek
Department of Sociology
University of Illinois
Urbana, Illinois

II - 1. Manpower General cont'd.

Jane Z. Hauser
St. Luke's Hospital Center
New York, New York

Arlene S. Holen
Columbia University
New York, New York

R. G. Hollister

Joseph R. Houchins

Loren Ihnen
North Carolina State University
Raleigh, North Carolina

S. C. Kelly, Jr.
Division of Research
Human Development and
Educational Planning Project
Ohio State University

John W. Kendrick
Department of Economics
University of Connecticut
Storrs, Connecticut

C. Kerr

Mary Dublin Keyserling
Women's Bureau
U. S. Department of Labor
Washington, D.C.

Joseph J. Klos
Oklahoma State University
Stillwater, Oklahoma

Leonard Lecht
National Planning Association
Washington, D.C.

Harvey Leibenstein
Department of Economics
University of California
Berkeley, California

Richard A. Lester
Princeton University
Princeton, New Jersey

E. E. Leibhafsky
University of Houston
Houston, Texas

William J. McGlothlin
Belknap Campus
University of Louisville
Louisville, Kentucky

Wilfred Malenbaum
Wharton School of Finance
and Commerce
University of Pennsylvania

Herman Miller
U. S. Bureau of the Census
Washington, D.C.

Thomas J. Mills
National Science Foundation
Washington, D. C.

Dr. Sigmund Nosow
School of Labor and
Industrial Relations
Michigan State
East Lansing, Michigan

Richard H. Orr

David A. Page

K. V. Pankhurst

Kenneth L. Parkhurst
Northern Michigan University
Marquette, Michigan

Herbert S. Parnes
Division of Research
Human Development and Educational
Planning Project
Ohio State University
Columbus, Ohio

Poor and Ziegler

Marvin V. Pundeff
Department of History
San Fernando Valley State College
Northridge California

II - 1. Manpower General cont'd.

Eugene Rabinowitch

Alice M. Rivlin
Office of the Secretary
Department of Health,
Education and Welfare
Washington, D.C.

Anne R. Roe
Graduate School of Education
Harvard University
Cambridge, Mass.

Maurice W. Roney
Oklahoma State University
Stillwater, Oklahoma

Peter H. Rossi
National Opinion Research
Center
Chicago, Illinois

Simon Rottenberg
Department of Economics and
Business Administration
Duke University
Durham, North Carolina

Jennifer Rowley
Department of Economics
University of Connecticut
Storrs, Connecticut

Max A. Rutzick

Robert W. Scofield
Oklahoma State University
Stillwater, Oklahoma

Theodore W. Schultz
Department of Economics
University of Chicago

Tibor Scitovsky
University of California
Berkeley, California

James G. Scoville
Department of Economics
Harvard University

Gerald G. Somers
Department of Economics
University of Wisconsin
Madison, Wisconsin

J. M. Stalnaker
National Merit Scholarship,
Corporation
Evanston, Illinois

Bruno Stein
New York University
New York, New York

Jack Stieber
School of Labor and Industrial
Relations
Michigan State University
East Lansing, Michigan

George J. Stigler
Department of Economics
University of Chicago

Herbert E. Striner
U. S. Department of Labor's
Manpower Administration
Washington, D.C.

Marvin B. Sussman

Solomon Sutker
Oklahoma State University
Stillwater, Oklahoma

John A. Sweet
Department of Sociology
University of Michigan
Ann Arbor, Michigan

James D. Taruer
Oklahoma State University
Stillwater, Oklahoma

II - 1. Manpower General
cont'd.

Cora E. Taylor
Institute of Industrial Relations
University of California
Berkeley, California

D. L. Thomas
State University of Iowa
Iowa City, Iowa

Howard Tuckerman
Department of Industrial
Relations
University of Wisconsin
Madison, Wisconsin

J. R. Walsh
England

Arron W. Warner
Columbia University
New York, New York

James A. Wilson
Graduate School of Business
University of Pittsburgh
Pittsburgh, Pennsylvania

D. Wolfle
Program in Hospital Administration
Georgia State College
Atlanta, Georgia

George R. Wren

Harding B. Young
Graduate School of
Business Administration
Atlanta University
Atlanta, Georgia

II - 2. HEALTH MANPOWER GENERAL

Franklyn N. Arnhoff
National Institute of
Mental Health
Washington, D.C.

G. N. Barclay

Lucy Birky

Edward Blacker
Mass. Health Research
Institute Inc.

Montague Brown
Hospital Research and Educational
Trust of New Jersey
Princeton, New Jersey

R. L. Buck

Irene Butter
Bureau of Hospital
Administration
University of Michigan
Ann Arbor, Michigan

John P. Connelly

James F. Cummins
The Florence Heller Graduate School
for Advanced Studies in Social Welfare
Brandeis University
Waltham, Mass.

Dean C. Dauw

Harold Demone, Jr.
Mass. Health Research
Institute, Inc.
Boston, Mass.

Kurt Deushle
Johns Hopkins University
Division of International
Health
Baltimore, Maryland

J. Dixon

B. L. Donald
Institute of Hospital Administrators

Dr. Samuel S. Dubin
Pennsylvania State University
University Park, Pennsylvania

Robert H. Ebert
Dean
Harvard Medical School
Cambridge, Mass.

Ruth M. Farrisey

Paul J. Feldstein
Bureau of Hospital Administration
University of Michigan
Ann Arbor, Michigan

Rashi Fein
Brookings Institution
Washington, D.C.

Cameron Fincher
Georgia State College
Atlanta, Georgia

Alice Foreman
Division of International Health
Johns Hopkins University
Baltimore, Maryland

James Herrick Hall
Southern Illinois University
Carbondale, Illinois

W. Lee Hansen
Department of Economics
University of Wisconsin
Madison, Wisconsin

Peter Fenley Hart
School of Hygiene
University of Toronto
Toronto, Ontario, Canada

Dale L. Hiestand
Columbia University
New York, New York

Lawrence A. Hill
Bureau of Hospital Administration
University of Michigan
Ann Arbor, Michigan

II - 2. Health Manpower General cont'd.

Godfrey M. Hochbaum
Division of Community Health
Services
U.S.P.H.S.
Washington, D.C.

A. Holtman
Department of Economics
Wayne State University
Detroit, Michigan

E. Gartly Jaco
Program in Hospital Administration
University of Minnesota
Minneapolis, Minnesota

Stanislaw Judek
University of Ottawa
Ottawa, Ontario, Canada

Lord Kindersley

William L. Kissick
Office of the Secretary
Department of Health,
Education and Welfare
Washington, D.C.

R. Kraus

O. Lee Milton
Federation of American Societies
for Experimental Biology
Washington, D.C.

Edna S. Lepper
Mass. General Hospital
Boston, Mass.

Lowell Stern Levin
901 Jonas Salk Hall
University of Pittsburgh
Pittsburgh, Pennsylvania

H. LeRoy Marlow
Pennsylvania State University
University Park, Pennsylvania

Bernard Michael
U. S. Department of Labor
Bureau of Labor Statistics
Washington, D.C. 20210

R. L. Miller
University of Pennsylvania
Philadelphia, Pennsylvania

George E. Mitchell
U.S.P.H.S.
Washington, D.C.

W. J. Monagle
Rhode Island Hospital
Providence, Rhode Island

Peter Kong-Ming New
Department of Public Health
Practice
Graduate School of Public
Health
University of Pittsburgh
Pittsburgh, Pennsylvania

Thomas O'Farrell
American Hospital Association
Chicago, Illinois

O. G. Pratt
Rhode Island Hospital
Providence, Rhode Island

Louis S. Reed
U.S. Social Security Administration
Washington, D.C.

R. W. Revans
England

Milton I. Roemer
U.C.L.A.
Los Angeles, California

Howard A. Rusk
Institute of Physicial Medicine
and Rehabilitation
400 E. 34th Street
New York, New York

II - 2. Health Manpower General
cont'd.

Dr. John R. Seale
Private Practice
London, England

William P. Shepard
33 E. 68th Street
New York, New York

Daniel Schechter
American Hospital Association
Chicago, Illinois

A. R. Somers
Princeton University
Princeton, New Jersey

Allen D. Spiegel
The Medical Foundation, Inc.
227 Commonwealth Avenue
Boston, Mass.

Maxine G. Stewart
U.S. Department of Labor
Washington, D.C.

John D. Stoeckle

Karl Taylor
Johns Hopkins University
Baltimore, Maryland

Jeffry H. Weiss
Office of the Assistant Secretary
for Program Planning
Department of Health, Education
and Welfare
Washington, D.C.

Edward Wellin
American Public Health
Association
New York, New York

Margaret D. West
U.S.P.H.S.
Washington, D.C.

G. C. Wirick
Bureau of Hospital Administration
University of Michigan
Ann Arbor, Michigan

Dr. C. A. Yeracaris
Department of Sociology
University of Buffalo
Buffalo, New York

D. E. Yett
School of Business
University of Southern California
Los Angeles, California

II - 3. DENTISTS

John C. Bauer

Ruth D. Bothwell
U.S.P.H.S.
Washington, D.C.

B. Isabel Boyd
Canadian Dental Association
234 St. George Street
Toronto 5, Ontario, Canada

Kathryn J. Connor
U.S.P.H.S.
Washington, D.C.

C. W. Gilman

Byron S. Hollinshead
American Council on Education
Washington, D. C.

Harry V. Kincaid
Stanford Research Institute
Menlo Park, California

Maurice Leven

B. Duane Moen
Bureau of Economic Research
and Statistics
American Dental Association
Chicago, Illinois

Walter J. Pelton
U.S.P.H.S.
Washington, D.C.

Prof. Enrico L. Quarantelli
The Ohio State University
Departments of Sociology and
Anthropology
1775 S. College Road
Columbus Ohio

Marvin Strauss
Public Health Federation
2400 Reading Road
Cincinnatti, Ohio

Gerald D. Timmons
American Dental Association
Chicago, Illinois

II - 5. NURSES

G. F. Adams

Patrician Alder

Louise C. Anderson

Ruth M. Anderson
School of Nursing
Western Reserve University
Cleveland, Ohio

R. F. Badgley
Milbank Memorial Fund
New York, New York

Helen Belcher
Division of Nursing
U.S.P.H.S.

Harriet S. Bell

Helen G. Beltran
National League for Nursing
10 Columbus Circle
New York, New York

M. Borland
Washington University
St. Louis, Missouri

Bottone
School of Public Health
and Administrative Medicine
Columbia University
New York, New York

Ray E. Brown
Program in Hospital Administration
Duke University
Durham, North Carolian

Vernita L. Cartlier

Ralph A. Cooper
Mental Health Research Unit
New York Department of
Mental Hygiene
Syracuse, New York

Ronald C. Corwin

M. E. Courtnet

Henrietta Dabney
American Nurses Association
New York, New York

Mrs. J. Evlyn Dalman
School of Hygiene
Toronto, Ontario, Canada

Katherine M. Disoway

Ruth Edelson

Jo Eleanor Elliott
Western Interstate Commission
for Higher Education
University of Colorado
Boulder, Colorado

Hessel H. Flitter
Research and Studies Service
National League for Nursing

J. R. Folta
Department of Sociology
University of Washington
Seattle, Washington

Ruth B. Freeman
School of Public Health
Johns Hopkins University
Baltimore, Maryland

M. G. Gabig
Department of Sociology
The Catholic University of America
Washington, D.C.

Mrs. Harold A. Gibbard

Gary G. Grenholm
Bureau of Hospital Administration
University of Michigan
Ann Arbor, Michigan

Cynthia Henderson

Virginia Henderson

Nathen Hershey

Richard J. Hill
Department of Sociology
University of Texas
Austin, Texas

II - 5. Nurses
cont'd.

Sister M. Amadeus Klein
The National League for Nursing
New York, New York

Mrs. Olive Klump
Bureau of Public Health Nursing
Los Angeles County Health Department
Los Angeles, California

Louis J. Kroeger
California State Nurses' Association

James A. Lamb
Program in Hospital Administration
Duke University
Durham, North Carolina

E. Lambertson
Director
School of Nursing
Columbia University
New York, New York

Lucille Leone

Eugene Levine
Division of Nursing
U.S.P.H.S.
Washington, D.C.

P. L. McIlwraith

S. Dale McLemore
The University of Texas
Austin, Texas

William Maher
Department of Economics
Boston College

P. W. Marden
Department of Sociology
University of Illinois

Anthony J. Mannino

Mrs. Eleanor Marshall
American Nurses' Association
New York, New York

Evelyn Moses
American Nurses Association
New York, New York

Helen K. Mussallem
Canadian Nurses' Association
Ontario, Canada

Mary V. Neal
National League for Nursing
New York, New York

David C. Nichols
University of Michigan
Ann Arbor, Michigan

Virginia M. Ohlson

David E. Olsson
San Jose Hospital
San Jose, California

K. Ollerenshaw
England

Nona Tiller Pair
Western Interstate Commission
for Higher Education
Boulder, Colorado

Ronald M. Pavalko
College of Letters and Sciences
University of Madison
Madison, Wisconsin

Frances K. Peterson

Dorothy E. Reese
Public Health Service
Division of Nursing
Department of Health, Education
and Welfare

F. J. Rubenstein
Department of Sociology
University of Pittsburgh
Pittsburgh, Pennsylvania

Bernard Segal

II - 5. Nurses
cont'd

Arnold Simmel
Faculty of Medicine
Columbia University
New York, New York

Leo W. Simmons
School of Nursing
Yale University
New Haven, Conn.

Laura L. Simms
Associate Director
  of Nursing
New York Hospital
New York, New York

Paul J. Spencer
The Faulkner Hospital
Jamaica Plain
Boston, Mass.

Joy Taira
Division of Nursing
U.S.P.H.S.
Washington, D. C.

Arthur Testoff

Herman Turk

II - 6. PARAMEDICAL PERSONNEL

Elyse W. Beck

Mary K. Bloetjes

Norman A. Brady

Terry Allen Brown
Program in Hospital
Administration
Duke University
Durham, North Carolina

Dr. Robert Cadmus
North Carolina Memorial Hospital

Donald C. Carner

John L. Carr
Program in Hospital
Administration
University of Minnesota
Minneapolis, Minnesota

Lillian Chabal
American Physical
Therapy Association

Clement C. Clay
Division of Medical Care
Administration
School of Public Health
Columbia University
New York, New York

Edward J. Connors
University Hospital
Madison, Wisconsin

Mary Couch

Myron D. Fottler
Graduate School of
Business
Columbia University
New York, New York

Neil L. Gaynes

Ann Gernes

Frances Ginsberg

Regina Gottlieb

John R. Griffith
University of New South Wales
Australia

Rudman Ham

James A. Hamilton
Program in Hospital Administration
School of Public Health
University of Minnesota
Minneapolis, Minnesota

R. V. Heckel

James J. Herman

Robert G. Kesel

Maurice G. Kott
Edward R. Johnstone Training and
Research Center
Bordentown, New Jersey

May Lipscomb

Robert S. Meyers
The Ames College of Surgeons
Chicago, Illinois

Marjorie Moon
The Institute for Medical
Social Workers
42 Bedford Square
London, W.C.1, England

E. T. Rees
University of New South Wales
Australia

Julius A. Roth

Milvoy S. Seacat
Health Information Foundation
Chicago, Illinois

Kathleen M. Slack
The Institute for Medical
Social Workers
42 Bedford Square
London, W.C.1, England

Herbert E. Straughn
University of Pittsburgh
Pittsburgh, Pennsylvania

II - 6. Paramedical Personnel cont'd.

Glen A. Thomas

Gail L. Warden
Presbyterian St. Luke's Hospital
Chicago, Illinois

Richard C. Ziegler
Edward R. Johnstone Training
and Research Center
Bordentown, New Jersey

II. PHYSICIANS

Patrick Accardi
Community Welfare Council
921 Genesee Building
Buffalo, New York

Ralph E. Adams
Graduate Program in
Hospital Administration
University of Chicago
Chicago, Illinois

Marian E. Altenderfer
U.S.P.H.S.
Washington, D.C.

Isidore Altman
University of Pittsburgh
Pittsburgh, Pennsylvania

S. J. Axelrod
University of Michigan
Ann Arbor, Michigan

Kurt Back

George W. Backman

Richard Bailey
School of Business Administration
University of California
Berkeley, California

R. Berson
American Association of
Medical Colleges
Evanston, Illinois

Walter E. Boek
Institute for the Advancement
of Medical Communication
New York, New York

Henry Bradshaw

William W. Brickman

Rue Bucher
University of Illinois
College of Medicine
Chicago, Illinois

C. W. Buggs

R. M. Campau

J. Ceithmal

Edward D. Churchill

Dean A. Clark
Association of American
Medical Colleges
Evanston, Illinois

John L. Clombatos
Public Health
Administrative Medicine
Columbia University
New York, New York

Lowell T. Coggeshall
Vice President
University of Chicago
Chicago, Illinois

R. E. Coker, Jr.

J. H. Comroe, Jr., ed.
Association of American
Medical Colleges
Evanston, Illinois

Frank G. Dickinson

J. E. Deitrick

T. G. Donnelly

B. V. Dryer

Richard L. Durbin
Tuscon Medical Center
Tuscon, Arizona

Jane Emery

L. J. Evans

Isidore S. Falk
School of Medicine
Yale University
New Haven, Connecticut

F. A. Fosick
Columbia University
Department of Sociology
New York, New York

II. Physicians
cont'd.

Manet Fowler
Research Director
Evaluative Study
New York State Department
of Health

Milton Friedman
Department of Economics
University of Chicago
Chicago, Illinois

Elliot Friedson
Department of Sociology
New York University
New York, New York

D. H. Funkenstein
Harvard Medical School
Cambridge, Massachusetts

Helen H. Gee
American Association of
Medical Colleges
Evanston, Illinois

J. W. Gerdes
Assistant Professor of Medicine
and Hospital Administration
University of Pittsburgh
Pittsburgh, Pennsylvania

William A. Glaser
School of Medicine
Western Reserve
Cleveland, Ohio

Dr. Bernard Goldstein
Management and Labor
Relations Institute
Rutgers University
New Brunswick, New Jersey

Marjorie Gooch

Gerald Allen Green
University of SouthernCalifornia
School of Medicine
Los Angeles, California

Oswald Hall

E. Halpern
Association of American
Medical Colleges
Evanston, Illinois

William Dean Henry
Commission on Education of the
American Academy of General Practice
Kansas City, Missouri

James O. Hepner
Washington University
St. Louis, Missouri

N. Hershey
Association of American
Medical Colleges
Evanston, Illinois

John W. Holland, M.D.

Hutchins

C. Jacobson
Association of American
Medical Colleges
Evanston, Illinois

William N. Jeffers

Allen C. Johnson

Davis G. Johnson

Jane Gaudette Jones
The Florence Heller School for
Advanced Studies in Social Welfare
and Heller Research Center
Brandeis University
Waltham, Massachusetts

Denise B. Kandel
Columbia University
New York, New York

L. Karel

Kay A. Keiser
Program in Hospital Administration
Yale University
New Haven, Connecticut

Thomas D. Kinney
Duke University Medical Center
Durham, North Carolina

II. Physicians
cont'd.

Hilda H. Kroeger
Associate Professor of Medicine
and Hospital Administration
University of Pittsburgh
Pittsburgh, Pennsylvania

Simon Kuznets
Harvard University
Cambridge, Massachusetts

Carrol B. Larson
College of Medicine
University of Illinois
Chicago, Illinois

J. W. Lubin
California Department of
Public Health
Sacramento, California

M. Lurie
University of Wisconsin
Milwaukee, Wisconsin

Aims C. McGuiness
New York Academy of Medicine
New York, New York

James A. Maxwell
University of Chicago
Chicago, Illinois

Werner M. Mendel
University of Southern California
School of Medicine
Los Angeles, California

Herbert Menzel

Irving R. Merrill
University of California
Medical Center
San Francisco, California

Robert Merton
Department of Sociology
Columbia University
New York, New York

G. E. Miller
College of Medicine
University of Illinois
Chicago, Illinois

D. Mills
Department of Sociology
University of Alberta at Calgary
Calgary, Alberta, Canada

W. R. Mills
University of Michigan
Ann Arbor, Michigan

Mary Monk

Joel B. Montague, Jr.
Department of Sociology
Washington State University

Hayden C. Nicholson, M.S.
Hospital Council of Greater New York
3 East 54th Street
New York, New York

Maryland Y. Pennell
U.S.P.H.S.

B. G. Philips

Dr. Lee Powers
Association of American
Medical Colleges
Evanston, Illinois

M. Prince
Department of Sociology
Columbia University
New York, New York

Dr. Edward L. Rada
School of Public Health
U.C.L.A.
Los Angeles, California

E. Rayack
University of Rhode Island
Kingston, Rhode Island

Melvin W. Reder
Stanford University
Department of Economics
Stanford, California

I. M. Reed
California Department of
Public Health

II. Physicians
cont'd.

Robert Richart
St. Louis University
St. Louis, Missouri

Gaston V. Rimlinger
Department of Economics
Rice University
Houston, Texas

Alexander Robertson
Department of Social and
Preventive Medicine
University of Saskatchewan

C. H. W. Ruhe

Paul J. Sanazaro
Association of American
Medical Colleges
Evanston, Illinois

Carleton F. Scofield
Center for Applied
Social Research
New York University

Aura E. Severinghaus

Paul B. Sheatsley
National Opinion
Research Center
University of Chicago
Chicago, Illinois

Cecil G. Sheps
Beth Israel Hospital
New York, New York

Rosemary A. Stevens
Yale University
New Haven, Connecticut

William L. Straus, Jr.

Milton Terris

Anne Tipner

Bernard R. Tresnowski
Blue Cross Association
Chicago, Illinois

John Walsh

Herman G. Weiskotten

Kelly M. West
Oklahoma State Medical School
Oklahoma City, Oklahoma

George H. Whipple

Greer Williams

G. A. Wolf, Jr.
Association of American
Medical Colleges
Evanston, Illinois

G. L. Worstell
California Department of
Public Health
Sacramento, California

III. OPERATIONS RESEARCH

Joseph Balintfy
Tulane University
New Orleans, Louisiana

Karl G. Bartshct
Hospital Systems Research Group
University of Michigan
Ann Arbor, Michigan

Paul Bash
University of Wisconsin Hospitals
Madison, Wisconsin

W. D. Bryant
Community Studies, Inc.
Kansas City, Missouri

Josephine Callahan
Community Studies, Inc.
Kansas City, Missouri

Robert Connor
National Institutes of Health
Washington, D.C.

Keith H. Crane
Community Systems Foundation
University of Michigan
Ann Arbor, Michigan

David Crook
Community Systems Foundation
University of Michigan
Ann Arbor, Michigan

Burton V. Dean
Case Institute of Technology
Cleveland, Ohio

George L. Deschambeau
Coordinator of Special Studies
in Hospital Management
Chicago Hospital Council
Chicago, Illinois

W. T. Delamar
Hospital Management Systems
Society
840 North Lake Shore Drive
Chicago, Illinois

Beatrice Donaldson
University of Wisconsin
Madison, Wisconsin

Robert Eastman
University of Missouri
Columbia, Missouri

Col. Sam A. Edwards
Director
Graduate Program in Hospital
Administration
Trinity College
San Antionio, Texas

Joseph Emerzian
University of Connecticut
Storrs, Connecticut

Ernst and Ernst
Duke Endowment Management
Control Program
Charlotte, North Carolina

S. D. Evans
Burton-on-Trent Hospital
Management Committee
Burton-on-Trent, England

Robert B. Fetter
Yale University
New Haven, Connecticut

Charles D. Flagle
School of Hygiene and Public Health
John Hopkins University
Baltimore, Maryland

John R. Freeman
Department of Industrial and
Systems Engineering
University of Florida
Gainesville, Florida

Richard Friedland
Community Systems Foundation
University of Michigan
Ann Arbor, Michigan

III. Operations Research cont'd.

J. Fry

John J. Fulmer
University of Kentucky
Lexington, Kentucky

Herbert P. Galliher, Jr.
Department of Industrial Engineering
University of Michigan
Ann Arbor, Michigan

John Gaut

Jay Goldman
Department of Industrial Engineering
Jewish Hospital of St. Louis
St. Louis, Missouri

Stephen P. Gray
University of Michigan
Ann Arbor, Michigan

Ronald Gue
University of Florida
Gainesville, Florida

David H. Harris
Community Systems Foundation
University of Michigan
Ann Arbor, Michigan

James L. Hawkins
Purdue University
Lafayette, Indiana

LaVerne L. Hoag
University of Michigan
Ann Arbor, Michigan

William Michael Hopp
Community Systems Foundation
University of Michigan
Ann Arbor, Michigan

William J. Horvath
Mental Health Research Institute
University of Michigan
Ann Arbor, Michigan

William F. Howard
University of Michigan
Ann Arbor, Michigan

Daniel Howland
Ohio State University
Columbus, Ohio

W. R. Hudson
State University of Iowa
Iowa City, Iowa

Irene James
England

Richard C. Jelinek
Bureau of Hospital Administration
University of Michigan
Ann Arbor, Michigan

G. Kancharla
England

Theodore E. Kelly
Institute of Science and Technology
University of Michigan
Ann Arbor, Michigan

Charles L. Kennedy
Hospital Administration
University of Michigan
Ann Arbor, Michigan

Arthur Klinschmidt

Richard A. Kurtz
University of Nebraska
Lincoln, Nebraska

Patric Ludwig
Commumity Systems Foundation
1610 Pontiac
Ann Arbor, Michigan

Vernon MacLeod
Community Systems Foundation
University of Michigan
Ann Arbor, Michigan

III. Operations Research cont'd

Marjorie M. McKinley

Harvey Machover

Annabell Marteney

Murray Melbin
McLean Hospital
Belmont, Massachusetts

Robert G. Michaels

Stephen J. Miller
Community Studies, Inc.
Kansas City, Missouri

Geraldine M. Montag

Gerald Nadler
University of Wisconsin
Madison, Wisconsin

Edmund K. Nelson
Program in Hospital Administration
University of Minnesota
Minneapolis, Minnesota

Robert J. Nelson
Program in Hospital Administration
School of Public Health
University of Minnesota
Minneapolis, Minnesota

Alexander B. Nemeth
University of Michigan
Ann Arbor, Michigan

John B. Neuhardt
University of Michigan
Ann Arbor, Michigan

Gladys Nite
Community Studies, Inc.
Kansas City, Missouri

Margaret A. Ohlson

C. Jorge de Jesus Ortiz
Operations Research Division
The Johns Hopkins Hospital
Baltimore, Maryland

Grace L. Ostenso

Roger Parker
Johns Hopkins University
Baltimore, Maryland

George M. Parks

Francis Powell
Cook County School of Nursing
Chicago, Illinois

Joseph De La Puente

Dorothy Rehm

Doris E. Roberts
World Health Organization

Edward P. Robinson

Gary J. Robinson
Yale University
New Haven, Connecticut

Thomas Rockwell
Ohio State University
Columbus, Ohio

Ervin F. Rothenbuhler
U.S.P.H.S.
Washington, D. C.

Ruickert
Delaware Hospital, Inc.
Wilmington, Delaware

Charles M. Sanders

Van Sandstrom
Institute of Science and
Technology
University of Michigan

III. Operations Research
cont'd.

Varsha Shah
Johns Hopkins University
Baltimore, Maryland

Stanley Siegel

John L. Silverman
Institute of Science and Technology
University of Michigan
Ann Arbor, Michigan

Sister Mary Ann Frances

Harold E. Smalley
Georgia Institute of Technology
Atlanta, Georgia

Raymond J. Smith
Institute of Science and Technology
University of Michigan
Ann Arbor, Michigan

Wayne H. Smith
University of Michigan
Ann Arbor, Michigan

David H. Stimson
University of California
Berkeley, California

John D. Thompson
Program in Hospital Administration
Yale University
New Haven, Connecticut

Martin Z. Verzi

J. A. Waller

Robert Werneke
University of Wisconsin Hospitals
Madison, Wisconsin

Harvey Wolfe
University of Pittsburgh
Pittsburgh, Pennsylvania

John P. Young
Operations Research Division
Johns Hopkins Hospital
Baltimore, Maryland

IV. HEALTH SERVICES AND HEALTH SERVICES RESEARCH GENERAL

Faye G. Abdellah
Division of Nursing
U.S.P.H.S.
Washington, D.C.

Ronald M. Anderson
Health Information Foundation
University of Chicago
Chicago, Illinois

Odin W. Anderson
National Opinion Research Center
University of Chicago
Chicago, Illinois

R. C. Barnes

B. R. Blishen
University of British Columbia
Vancouver, B. C., Canada

H. L. Blum

Philip Booth
School of Social Work
University of Michigan
Ann Arbor, Michigan

Agnes Brewster
Health Economics Branch
Division of Medical Care Administration
U.S.P.H.S.
Washington, D.C.

Patricia Colette
National Opinion Research Center
University of Chicago
Chicago, Illinois

Royal A. Crystal
Health Economics Branch
U.S.P.H.S.
Washington, D.C.

Benjamin J. Darsky
Bureau of Public Health Economics
School of Public Health
University of Michigan
Ann Arbor, Michigan

M. B. Davis

P. M. Densen
New York City Dept. of Health
New York, New York

Virginia Detloff
Hospital Utilization Research Project
Bureau of Hospitals
State of California
Department of Public Health

Edward Dolinsky
Medical-Health Research Association
of New York City, Incorporated

A. Donabedian
School of Public Health
University of Michigan
Ann Arbor, Michigan

Daniel L. Drosness
Rosenfeld Association
New York, New York

R. D. Eilers
Huebner Institute
University of Pennsylvania
Philadelphia, Pennsylvania

Ray Elling

Jacob J. Feldman
National Opinion Research Center
University of Chicago
Chicago, Illinois

H. E. Freeman

Malvern J. Gross
Rochester Regional Hospital
Council, Inc.
274 Monroe Avenue
Rochester, New York

Carl Kahler
St. Louis University
St. Louis, Missouri

Robert L. Kahn
Association of American
Medical Colleges
Evanston, Illinois

Monroe Lerner
School of Public Health
Johns Hopkins University
Baltimore, Maryland

IV. Health Services and Health Services Research General cont'd.

Rensis Likert
Institute of Social Research
University of Michigan
Ann Arbor, Michigan

Lord Llewelyn-Davis
Bartlett School of Architecture
University College
London, England

Ida C. Merriam
U. S. Social Security Administration
Washington, D.C.

S. F. Miyamoto

Joel O. Montgomery
Medical College of Virginia

F. R. Moore
U.S.C. School of Medicine
San Jose, California

Osler L. Peterson
Harvard University
Cambridge, Massachusetts

Robert L. Robertson
College of Business Administration
University of Cincinnati
Cincinnati, Ohio

I. M. Rosenstock
School of Public Health
University of Michigan
Ann Arbor, Michigan

Nathan Sinai
Ann Arbor, Michigan

Eleanor M. Snyder
Urban Medical Economics Research Project
40 Worth Street
New York, New York

Jerry A. Solon
Graduate School of Public Health
University of Pittsburgh
Pittsburgh, Pennsylvania

R. M. Titmuss
London School of Economics
London, England

Geoffrey Vicker

Dr. H. Barry Waldman
Highland View Hospital
3901 Ireland Drive
Cleveland, Ohio

H. Ashley Weeks
School of Public Health
University of Michigan
Ann Arbor, Michigan

Worthington
Urban Medical Economics Research Project
40 Worth Street
New York, New York

J. S. Zawachi
University of Pittsburgh
Pittsburgh, Pennsylvania

RESEARCHERS IN FIELDS RELATED TO HEALTH MANPOWER

Listed by Location

University of Alberta at Calgary, Calgary, Alberta, Canada
Mills, D., Department of Sociology

American Academy of General Practice, Kansas City, Missouri
Dean, William Henry, Commission on Education

American Association of Junior Colleges, Washington, D.C.
Harris, N. E.

American College of Surgeons, Chicago, Illinois
Meyers, Robert S.

American Council on Education, Washington, D.C.
Astin, Alexander
Hollinshead, Byron S.

American Dental Association
Moen, B. Duane, Bureau of Economics Research & Statistics

American Hospital Association, Chicago, Illinois
O'Farrell, Thomas
Schechter, Daniel

American Medical Association, Chicago, Illinois
Dickinson, Frank G., Bureau of Medical Economic Research

American Nurses Association, New York, New York
Dabney, Henrietta
Marshall, Mrs. Eleanor
Moses, Evelyn

American Physical Therapy Association
Chabal, Lillian

American Psychiatric Association
Lockman, Robert

American Public Health Association, New York, New York
Wellin, Edward

Association of American Medical Colleges, Evanston, Illinois
Berson, R.
Carroll, A. J.
Clark, Dean A.
Comroe, J. H., Jr.
Darley, Ward
Gee, Helen H.
Gerdes, J. W.
Halpern, E.
Hershey, N.
Jacobson, C.

Kahn, Robert L.
Powers, Dr. Lee
Sanazaro, Paul J.
Wolf, G. A., Jr.

Atlanta University, Atlanta, Georgia
Young, Harding R., Graduate School of Business Administration

Beth Israel Hospital, New York, New York
Chaps, C. G.
Clark, D. A.
Gerdes, J. R.
Halpern, E.
Hershey, N.

Blue Cross, Chicago, Illinois
McNerney, Walter J.
Tresnowski, Bernard R.

Blue Cross of Western Pennsylvania, Pittsburgh, Pennsylvania
Ro, Kong Kyun

Boston College, Boston, Massachusetts
Maher, William, Department of Economics

Brandeis University, Waltham, Massachusetts
Cummins, James F., M.D., The Florence Heller Graduate School for Advanced Studies in Social Welfare
Jones, Jane Gaudette, The Florence Heller Graduate School for Advanced Studies in Social Welfare and Heller Research Center
Rosenthal, Gerald, Department of Economics

University of British Columbia, Vancouver, B. C., Canada
Blishen, B. R.

Brookings Institution, Washington, D.C.
Fein, Rashi
Salant, Dr. Walter

University of Buffalo, Buffalo, New York
Yeracaris, Dr. C. A., Department of Sociology

Burton-on-Trent Hospital, Burton-on-Trent, England
Evans, S. D.
Tourt, D. M.

California Medical Education and Research Foundation, San Francisco, California
Callahan, Patricia
Klutch, Murray
Wood, Donald

California State Nurses' Association
Kroeger, Louis J.

State of California, Sacramento, California
Detloff, Virginia, Department of Public Health
Drosness, Daniel L., Department of Public Health

Ribak, Nancy, Department of Public Health
Littlestone, Ralph, Department of Mental Hygiene
Lubin, J. W., Department of Public Health
Reed, I. M., Department of Public Health
Worstell, G. L., Department of Public Health

University of California, Berkeley, California
Bailey, Richard, School of Business Administration
Blumberg, Mark S., Office of the Vice President
Garbarino, Joseph W., School of Business Administration
Gordon, R. A., Program on Unemployment and the American Economy
Leibenstein, Harvey, Department of Economics
Merrill, Irving R., University Medical Center
Schneider, Jerry, Regional Science Institute
Scitovsky, Tibor
Simons, John H., Institute of Industrial Relations
Stimson, David H.
Taylor, Cora E., Institute of Industrial Relations

University of California, Davis, California
Gramm, Warren S.

University of California, Los Angeles, California
Rada, Dr. Edward L., School of Public Health
Roemer, Milton I.

Canadian Dental Association, Toronto 5, Ontario, Canada
Boyd, B. Isabel

Canadian Nurses' Association, Ottawa 2, Ontario, Canada
Mussallem, Helen K.

Case Institute of Technology, Cleveland, Ohio
Dean, Burton V.

Catholic University of America, Washington, D.C.
Gabig, M. G., Department of Sociology

Chicago Hospital Council, Chicago, Illinois
Deschambeau, George L.

University of Chicago, Chicago, Illinois
Adams, Ralph E., Graduate Program in Hospital Administration
Anderson, Ronald M., Health Information Foundation
Anderson, Odin W., National Opinion Research Center
Collette, Patricia, National Opinion Research Center
Feldman, Jacob J., National Opinion Research Center
Bowman, Mary Jean, Department of Economics
Coggshell, Lowell T.
Friedman, Milton, Department of Economics
Henry, William E., School of Social Science
Kessell, Reuben A., School of Business
Long, Millard, School of Business
Maxwell, James A.
Rossi, Peter H., National Opinion Research Center
Schultz, Theodore W., Department of Economics
Seacat, Milvoy S., Health Information Foundation

Sheatsley, Paul B., National Opinion Research Center
Stigler, George J., Department of Economics

University of Cincinnati, Cincinnati, Ohio
Robertson, Robert L.

University of Colorado, Boulder, Colorado
Adams, E. Merle
Elliott, Jo Eleanor, Western Interstate Commission for Higher Education
Pair, Nona Tiller, Western Interstate Commission for Higher Education
Rose, Edward, Department of Sociology

Columbia University, New York, New York
Becker, Gary S., Department of Economics
Bottone, School of Public Health and Administrative Medicine
Clay, Clement C., School of Public Health
Clombotos, John L., School of Public Health and Administrative Medicine
Fosick, F. A., Department of Sociology
Fottler, Myron D., Graduate School of Business
Hiestand, Dale L.
Holen, Arlene, S.
Ginzberg, Eli, Center for Conservation of Human Resources
Kandel, Denise B.
Merton, Robert K., Department of Sociology
Muller, Charlotte
Prince, M., Department of Sociology
Simmel, Arnold, Faculty of Medicine
Warner, Arron W.

Commission on Human Resources and Advanced Education, Washington, D.C.
Folger, John K.

Community Studies, Inc., Kansas City Missouri
Bryant, W. D.
Callahan, Josephine
Miller, Stephen J.
Nite, Gladys

Community Systems Foundation, Ann Arbor, Michigan
Crane, Keith H.
Crook, David
Friedland, Richard
Harris, David H.
Hopp, William Michael
Ludwig, Patrice
MacLeod, Vernon
Steiner, Matthew

Community Welfare Council, Buffalo, New York
Accardi, Patrick

University of Connecticut, Storrs, Connecticut
Emerzian, Joseph
Kendrick, John W., Department of Economics
Rowley, Jennifer, Department of Economics

Cook County School of Nursing, Chicago, Illinois
Powell, Francis L. A.

Cornell University, Ithaca, New York
Aronson, Robert L., Department of Labor Economics and Income Security
Cohen, Harold A., Department of Economics
Dryden, Myles Muir, Graduate School of Business and Public Administration

Delaware Hospital, Inc., Wilmington, Delaware
Ruickert

Duke University, Durham, North Carolina
Brown, Ray E., Program in Hospital Administration
Brown, Terry Allen, Program in Hospital Administration
Ernst and Ernst
Kinney, Thomas D., Medical Center
Lamb, James A., Program in Hospital Administration
Rottenberg, Simon, Department of Economics and Business Administration

Faulker Hospital, Boston, Massachusetts
Spencer, Paul J.

Federation of American Societies for Experimental Biology, Washington, D. C.
Lee, Milton O.

Florida State Board of Health, Jacksonville, Florida
Hicks, Martha B.

University of Florida, Gainesville, Florida
Gue, Ronald

Fordham University, New York, New York
Gibbons, William J., Department of Economics

Georgia Institute of Technology, Atlanta, Georgia
Freeman, John R., Hospital Systems Research Group
Smalley, Harold E.

Georgia State College, Atlanta, Georgia
Fincher, Cameron
Wolfle, D., Program in Hospital Administration

Harvard University, Cambridge, Massachusetts
Berry, Ralph, Department of Economics
Carr, W. John, Graduate School of Public Administration
Dunlop, L. T., Department of Economics
Ebert, Robert H., Dean, Harvard Medical School
Funkenstein, D. H., Harvard Medical School
Kuznets, Simon
Peterson, Osler, L.
Roe, Anne R., Graduate School of Education
Scoville, James G., Department of Economics

Highland View Hospital, Cleveland, Ohio
Waldman, Dr. H. Barry

Hospital Council of Greater New York, New York, New York
Nicholson, Hayden C.

Hospital Management Systems Society, Chicago, Illinois
Delamar, W. T.

Hospital Research and Education Trust of New Jersey, Princeton, New Jersey
Brown, Montague

Hospital Review and Planning Center of Southern New York, New York, New York
Rorem, C. Rufus

University of Houston, Houston, Texas
Liebhafsky, E. E.

Hughes Aircraft Co., California
Laitin, Howard

University of Illinois, Champaign, Illinois
Ferber, Robert
Ford, Neil
Franke, Walter H.

University of Illinois, Chicago, Illinois
Bucher, Rue, College of Medicine

University of Illinois, Urbana, Illinois
Folk, H.
Haurek, Edward W., Department of Sociology
Marden, P. W., Department of Sociology

University of Illinois, Chicago, Illinois
Larson, Carrol B., College of Medicine
Miller, G. E., College of Medicine

University of Indiana, Bloomington, Indiana
De Witt, Nicholas, Departments of Economics and Government
Walker, Hugh D., Department of Economics

Institute for the Advancement of Medical Communication, New York, New York
Boek, Walter E.

Institute for Medical Social Workers, London, W.C.1, England
Moon, Marjorie
Slack, Kathleen M.

Institute of Hospital Administrators
Donald, B. L.

Institute of Physical Medicine and Rehabilitation, New York, New York
Rusk, Howard A.

International Labor Organization, Geneva, Switzerland
Bergmann, Ralph H.

Iowa State University, Ames, Iowa
Davey, Harold W.

University of Iowa, Iowa City, Iowa
Hudson, W. R.
Thomas, D. L.

Jewish Hospital of St. Louis, St. Louis, Missouri
Goldman, Jay, Department of Industrial Engineering

Johns Hopkins University, Baltimore, Maryland
Deushle, Kurt, Division of International Health
Flagle, Charles D.
Foreman, Alec, Division of International Health
Freeman, Ruth B., School of Public Health
German, Jeremiah J., School of Public Health
Klarman, Herbert W., School of Public Health
Lerner, Monroe, School of Public Health
Ortiz, C. Jorge de Jesus, Operations Research Division
Parker, Roger
Shah, Varsha
Taylor, Karl
Young, John P., Operations Research Division

Edward R. Johnstone Training and Research Center, Bordentown, New Jersey
Kott, Maurice G.
Ziegler, Richard C.

University of Kentucky, Lexington, Kentucky
Fulmer, John J.

Larned State Hospital, Larned, Kansas
Kemp, Hardy A.

University of London, London, England
Able-Smith, Brian, London School of Economics
Blaug, M., Institute of Education
Lord Llewelyn-Davis, Bartlett School of Architecture
Titmus, R. M., London School of Economics

Los Angeles County Health Department, Los Angeles, California
Klump, Olive, Bureau of Public Health Nursing

University of Louisville, Louisville, Kentucky
McGlothlin, William J.

McLean Hospital, Belmont, Massachusetts
Melbin, Murray

University of Maine, Orano, Maine
Clark, David H., College of Business Administration

Massachusetts General Hospital, Boston, Massachusetts
Lepper, Edna S., R. N.

Massachusetts Health Research Institute, Inc., Boston, Massachusetts
Blacker, Edward
Demone, Harold Jr.

Medical College of Virginia
Montgomery, Joel O.

Medical and Health Research Association of New York City, Inc., New York, New York
Dolinsky, Edward

Medical Foundation, Inc., Boston, Massachusetts
Spiegel, Allen D.

Memorial Hospital of Long Beach, Long Beach, California
Carner, Donald C.

Michigan State, Lansing, Michigan
Hardin, Einer, School of Labor and Industrial Relations
Nosow, Dr. Sigmund, School of Labor and Industrial Relations
Stieber, Jack, School of Labor and Industrial Relations

University of Michigan, Ann Arbor, Michigan
Axelrod, S. J., School of Public Health
Barlow, Robin, Department of Economics
Bartscht, Karl G., Hospital Systems Research Group
Booth, Philip, School of Social Work
Boulding, Kenneth E., Department of Economics
Brazer, Harvey E., Department of Economics
Butter, Irene, Bureau of Hospital Administration
Darsky, Benjamin J., Bureau of Public Health Economics, School of Public Health
Donabedian, A., School of Public Health
Feldstein, Paul J., Bureau of Hospital Administration
Galliher, Herbert P. Jr., Department of Industrial Engineering
Grenholm, G. G., Bureau of Hospital Administration
Gray, Stephen P.
Hill, Lawrence A., Bureau of Hospital Administration
Hoag, La Verne L., Institute of Science and Technology
Horvath, William J., Mental Health Research Institute
Howard, William F.
Jelinek, Richard C., Bureau of Hospital Administration
Kelly, Theodore E., Institute of Science and Technology
Kennedy, Charles L., Bureau of Hospital Administration
Likert, Rensis, Institute of Social Research
Mills, W. R.
Morgan, James N., Department of Economics
Nemeth, Alexander B.
Neuhardt, John B., Department of Industrial Engineering
Nichols, David C.
Penchansky, Roy, School of Public Health
Rosenstock, I. M., School of Public Health
Sandstrom, Van, Institute of Science and Technology
Silverman, John L., Institute of Science and Technology
Smith, Raymond J., Institute of Science and Technology
Smith, Wayne H.
Sweet, John A., Department of Sociology
Weeks, H. Ashley, School of Public Health
Wirick, G. C., Bureau of Hospital Administration

Milbank Memorial Fund, New York, New York
Badgley, R. G.

University of Minnesota, Minneapolis, Minnesota
Carr, John L., Program in Hospital Administration
Jaco, E. Gartly, Program in Hospital Administration
Kailander, Virginia
Michaels, Robert G., Program in Hospital Administration

Nelson, Edmund K., Program in Hospital Administration
Nelson, Roberta J., Program in Hospital Administration

University of Missouri, Columbia, Missouri
Eastman, Robert
Froelich, Robert E.
Hinchey, Samuel B.

National Bureau of Economics Research, New York, New York
Auster, R.
Blank, David S.
Easterlin, Richard A.
Fabricant, Solomon
Fuchs, V. R.
Levenson, Irving

National Education Television and Radio Center, New York, New York
Alter, Henry C.

National League for Nursing, New York, New York
Beltran, Helen G.
Flitter, Hessel H.
Klein, Sister M. Amadeus
Neal, Mary V.

National Merit Scholarships Corporation, Evanston, Illinois
Stalnaker, J. M.

National Planning Association, Washington, D.C.
Lecht, Leonard

National Science Foundation, Washington, D.C.
Mills, Thomas J.

University of Nebraska, Lincoln, Nebraska
Kurtz, Richard A.

University of New South Wales, Australia
Griffith, J. R.
Rees, E. T.

New York Academy of Medicine, New York, New York
McGuiness, Aims C.

New York City Department of Health, New York, New York
Densen, Paul M.

New York Hospital, New York, New York
Simms, Laura L.

New York Department of Mental Hygiene, Syracuse, New York
Cooper, Ralph A.

New York State Department of Health, New York, New York
Fowler, Manet

New York University, New York, New York
Friedson, Elliot, Department of Sociology
Gitlow, Abraham
Scofield, Carleton F.
Stein, Bruno

North Carolina Memorial Hospital
Cadmus, Dr. Robert

University of North Carolina, Chapel Hill, North Carolina
Hunt, Gerald J., Institute for Research in Social Sciences

North Carolina State University, Raleigh, North Carolina
Bishop, Charles E., Department of Economics
Carroll, Adger B., Department of Agricultural Economics
Ihnen, Loren

Northern Michigan University, Marquette, Michigan
Parkhurst, Kenneth L.

Northwestern University, Evanston, Illinois
Larmore, Mary L.
Rothenberg, Jerry, Department of Economics

Ohio State University, Columbus, Ohio
Howland, Daniel
Kelly, S. C., Jr., Division of Research, Human Development and Educational Planning
Parnes, Herbert S., Division of Research, Human Development and Educational Plannin
Quarantelli, Prof. Enrico L., Department of Sociology and Anthropology
Rockwell, Thomas

Oklahoma State University, Stillwater, Oklahoma
Klos, Joseph J.
Roney, Maurice W.
Scofield, Robert W.
Sutker, Solomon
Tarver, James D.
West, Kelly M., Medical School

University of Ottawa, Ottawa, Ontario, Canada
Judek, Stanislaw

Oxford University, Oxford, England
Feldstein, M. S., Nuffield, College

Palo Alto Medical Research Foundation, Palo Alto, California
Scitovsky, Anne

University of Pennsylvania, Philadelphia, Pennsylvania
Eilers, R. D.
Malenbaum, Wilfred, Wharton School of Finance and Commerce
Miller, R. L.

Pennsylvania State University, University Park, Pennsylvania
Dubin, Dr. Samuel S.
Marlow, H. Leroy

University of Pittsburgh, Pittsburgh, Pennsylvania
Altman, Isidore
Gerdes, J. W., Department of Medical and Hospital Administration
Kroeger, Hilda H., Department of Medical and Hospital Administration
Levin, Lowell Stern
New, Peter Kong-Ming, Department of Public Health Practice
Perlman, Mark, Department of Economics
Rubenstein, F. J., Department of Sociology
Sarachek, Dorothy
Solon, Jerry A., Graduate School of Public Health
Straughn, Herbert E.
Wilson, James A., Graduate School of Business
Wolfe, Harvey
Zawachi, J. S.

Presbyterian St. Lukes Hospital, Chicago, Illinois
Warden, Gail L.

Princeton University, Princeton, New Jersey
Berry, Charles H.
Bowen, William
Brown, J. D., Departments of Economics and Sociology
Harbison, R.
Kuenne, Robert E.
Lester, Richard A.
Monsma, George N.
Somers, A. R.
Somers, Herman M., Woodrow Wilson School of Public and International Affairs

Public Health Federation, Cincinnati, Ohio
Strauss, Marvin

Purdue University, Lafayette, Indiana
Hawkins, James L.

Queens College, New York, New York
Greenfield, Harry I.

Reed College, Portland, Oregon
Stevens, Carl

Rhode Island Hospital, Providence, Rhode Island
Monagle, W. J.
Pratt, O. G.

University of Rhode Island, Kingston, Rhode Island
Rayack, E.

Rice University, Houston, Texas
Rimlinger, Gaston V., Department of Economics

Rochester Regional Hospital Council, Inc., Rochester, New York
Gross, Malvern J.

Rosenfeld Associates, New York, New York
Drosness, Daniel L.

Rutgers University, New Brunswick, New Jersey
Berkowitz, Monro, Department of Economics
Goldstein, Dr. Bernard, Management and Labor Relations Institute

St. Louis University, St. Louis, Missouri
Kahler, Carl
Richart, Robert

St. Luke's Hospital Center, New York, New York
Hauser, Jane Z.

San Fernando Valley State College, Northridge, California
Pundeff, Marvin V., Department of History

San Jose Hospital, San Jose, California
Olsson, David E.

University of Saskatchewan
Robertson, Alexander, Department of Social and Preventative Medicine

University of Southern California, Los Angeles, California
Green, Gerald Allen, School of Medicine
Mendel, Werner M., School of Medicine
Moore, F. R., School of Medicine (San Jose)
Yett, D. E., School of Business

Southern Illinois University, Carbondale, Illinois
Hall, James Herrick

Stanford Research Institute, Menlo Park, California
Alexander-Frutchi, M. C.
Kincaid, Harry V.

Stanford University, Stanford, California
Arrow, Kenneth J., Department of Economics
Reder, Melvin W., Department of Economics

Texas Christian University, Fort Worth, Texas
Durham, Floyd, Department of Economics

University of Texas, Austin, Texas
Hill, Richard J., Department of Sociology
McLemore, S. Dale

University of Toronto, Toronto 5, Ontario, Canada
Dalman, Mrs. J. Evelyn, School of Hygiene
Hart, Peter Fenley, School of Hygiene

Trinity College, San Antonio, Texas
Edwards, Col. Sam A., Director, Graduate Program in Hospital Administration

Tulane University, New Orleans, Louisiana
Balintfy, Joseph

Tuscon Medical Center, Tuscon, Arizona
Durbin, Richard L.

U.S. GOVERNMENT

Department of Health, Education and Welfare

Abdellah, Faye G., Division of Nursing, U.S.P.H.S.
Arnhoff, Franklyn N., National Institute of Mental Health
Belcher, Helen, Division of Nursing, U.S.P.H.S.
Bothwell, Ruth D., U.S.P.H.S.
Brewster, Agnes, Health Economics Branch, U.S.P.H.S.
Conley, Ronald W., National Institute of Mental Health, U.S.P.H.S.
Commor, Kathryn J., U.S.P.H.S.
Connor, Robert J., National Institutes of Health
Crystal, Royal A., Health Economics Branch, U.S.P.H.S.
Hanft, Ruth S., Social Security Administration
Hochbaum, Godfrey M., Division of Community Health Services, U.S.P.H.S.
Kissick, William L., Office of the Secretary
Levine, Eugene, Division of Nursing, U.S.P.H.S.
Linnenberg, Clem C., U.S.P.H.S.
McGibony, J. R., Division of Hospital and Medical Facilities, U.S.P.H.S.
Merriam, I. C., U. S. Social Security Administration
Mitchell, George E., U.S.P.H.S.
Moriyama, Iwao, M., U.S.P.H.S.
Pelton, Walter J., U.S.P.H.S.
Pennell, M. Y., U.S.P.H.S.
Reed, L. S., U. S. Social Security Administration
Reese, Dorothy E., Public Health Service, Division of Nursing
Rice, Dorothy, Social Security Administration
Rivlin, Alice M., Office of the Secretary
Rothenbuhler, Ervin R.
Rucker, T. Donald, Social Security Administration
Taira, Joy, Division of Nursing, U.S.P.H.S.
Weiss, J. H., Office of Assistant Secretary for Program Planning
West, Margaret D., U.S.P.H.S.

Department of Labor

Bernard, Michael, Bureau of Labor Statistics
Copeland, William L., Commission of Labor Statistics
Douty, H. M., Bureau of Labor Statistics
Green, Alfred L., Bureau of Employment Security
Keyserling, Mary Dublin, Women's Bureau
Stewart, Maxine G.
Striner, Herbert E., Manpower Administration
Sturm, Herman M., Bureau of Labor Statistics

Other Departments

Labovitz, I. M., Library of Congress, Legislative Reference Service
Miller, Herman, U. S. Bureau of the Census
Mushkin, Selma J., Council of State Government

Urban Medical Economics Research Project, New York, New York

Piore, Nora
Snyder, Eleanor M.
Worthington

Virginia State College, Norfolk, Virginia

Gadson, James H., Departments of Economics, Sociology and Psychology

University of Washington, Seattle, Washington

Folta, J. R., Department of Sociology
McCaffree, K. M.

Washintgon State University, Pullman, Washington
Montague, Joel B., Jr., Department of Sociology

Washington University, St. Louis, Missouri
Borland, M.
Hepner, James O.

Wayne State University, Detroit, Michigan
Correa, Hector
Holtman, A., Department of Economics

Western Reserve, Cleveland, Ohio
Anderson, Ruth M., School of Nursing
Glaser, William A., School of Medicine

University of Wisconsin, Madison, Wisconsin
Bash, Paul, University of Wisconsin Hospitals
Connors, Edward J., University Hospital
David, Martin, Department of Economics
Donaldson, Beatrice
Hansen, W. Lee, Department of Economics
Lampman, Robert J.
Nadler, Gerald
Pavalko, Ronald M., College of Letters and Sciences
Somers, Gerald G., Department of Economics
Tuckerman, Howard, Department of Industrial Relations
Weisbrod, Burton A., Department of Economics
Werneke, Robert, University Hospital

University of Wisconsin, Milwaukee, Wisconsin
Lurie, M.

World Health Organization
Roberts, Doris E.
Ruderman, A. Peter
Russell, Dr. Paul

Yale University, New Haven, Conn.
Falk, Isadore S., School of Medicine
Fetter, Robert B.
Keiser, Kay A., Program in Hospital Administration
Robinson, Gary J.
Simmons, Lew W., School of Nursing
Stevens, R. A., Medical Care Program
Thompson, John

SECTION FIVE

MEDIA OF COMMUNICATION: SOURCES OF INFORMATION FOR HEALTH MANPOWER RESEARCHERS

The media of communication in fields related to health manpower are important sources of information for health manpower researchers. These media include journals, abstracts and bibliographies; professional and research organizations regularly issuing pertinent literature; and conferences.

We have compiled a list of media of communication that have been of use to us in this study. In the future, it would be of great value to complete this tentative list (which does not include conferences). This would involve gathering the names of all the major media in the field, and investigating the nature, the relative influence and the usefulness to health researchers of each one.

Our preliminary list of media of communcation useful to health researchers is as follows:

I. Journals of interest to health manpower researchers
  A. Journals of Health Professions
    1. Dentists
      DENTAL SURVEY
      JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

    2. Hospitals
      BRITISH HOSPITAL JOURNAL AND SOCIAL SERVICE REVIEW
      CANADIAN HOSPITAL
      HOSPITAL ADMINISTRATION
      HOSPITAL ADMINISTRATION IN CANADA
      HOSPITAL FORUM
      HOSPITAL MANAGEMENT
      HOSPITAL PROGRESS
      HOSPITALS, JOURNAL OF THE AMERICAN HOSPITAL ASSN.
      HOSPITAL TOPICS
      THE HOSPITAL (British)
      THE MODERN HOSPITAL
      WORLD HOSPITALS

    3. AMERICAN JOURNAL OF PSYCHIATRY
      BRITISH MEDICAL JOURNAL
      GROUP PRACTICE

HOSPITAL PHYSICIAN
JOURNAL OF THE AMERICAN MEDICAL ASSN.
JOURNAL OF CHRONIC DISEASES
JOURNAL OF MEDICAL EDUCATION
MEDICAL ECONOMICS
THE LANCET (British)
THE NEW ENGLAND JOURNAL OF MEDICINE
JOURNAL OF THE AMERICAN OSTEOPATHIC ASSN.

4. Nursing
AMERICAN JOURNAL OF NURSING
INTERNATIONAL NURSING REVIEW
NURSING FORUM
NURSING OUTLOOK
NURSING RESEARCH
NURSING TIMES (British)

5. Paramedical Professions
AMERICAN JOURNAL OF HOSPITAL PHARMACY
AMERICAN JOURNAL OF OCCUPATIONAL THERAPY
HOSPITAL ACCOUNTING
JOURNAL OF THE AMERICAN DENTAL HYGIENISTS' ASSN.
JOURNAL OF THE AMERICAN DIETETIC ASSN.
MEDICAL RECORD NEWS
MEDICAL SOCIAL WORK (British)
PHYSICAL THERAPY

6. Public Health, Mental Health, Medical Care
AMERICAN JOURNAL OF PUBLIC HEALTH & THE NATIONS HEALTH
CANADIAN JOURNAL OF PUBLIC HEALTH
COMMUNITY MENTAL HEALTH JOURNAL
MEDICAL CARE
MENTAL HOSPITALS
PROGRESS IN HEALTH SERVICES
WORLD HEALTH
JOURNAL OF HEALTH & HUMAN BEHAVIOR
MILBANK MEMORIAL QUARTERLY

B. Journals of Non-Health Professions

1. Economics
AMERICAN ECONOMIC REVIEW
ECONOMICA
HARVARD BUSINESS REVIEW
JOURNAL OF POLITICAL ECONOMY
QUARTERLY JOURNAL OF ECONOMICS
REVIEW OF ECONOMICS AND STATISTICS
SOUTHERN ECONOMIC JOURNAL

2. Industrial Engineering and Operations Research
HUMAN FACTORS
JOURNAL OF INDUSTRIAL ENGINEERING
MTM JOURNAL
OPERATIONS RESEARCH QUARTERLY
MANAGEMENT SCIENCE

3. Manpower, Management and Laobr Relations
   - INDUSTRIAL AND LABOR RELATIONS REVIEW
   - INTERNATIONAL LABOR RELATIONS
   - INDUSTRIAL MANAGEMENT
   - JOURNAL OF HUMAN RESOURCES
   - MANAGEMENT OF PERSONNEL QUARTERLY
   - MANPOWER JOURNAL
   - MONTHLY LABOR REVIEW

4. Sociology, Psychology, and Education
   - ADMINISTRATIVE SCIENCE QUARTERLY
   - AMERICAN PSYCHOLOGIST
   - AMERICAN SOCIOLOGICAL REVIEW
   - JOURNAL OF APPLIED PSYCHOLOGY
   - JOURNAL OF NEGRO EDUCATION
   - PERSONNEL PSYCHOLOGY
   - PSYCHOLOGICAL REVIEW
   - SOCIOMETRY

II. Bibliographies, Abstracts, Indices of Literature of interest to health manpower researchers

- ABSTRACTS OF HOSPITAL MANAGEMENT STUDIES, Quarterly, University of Michigan
- ABSTRACTS FOR SOCIAL WORKERS, Quarterly, New York
- AN INVENTORY OF SOCIAL AND ECONOMIC RESEARCH IN HEALTH, annual, University of Chicago
- EXCERPTA MEDICA, monthly
- HEALTH CARE FACILITY AND PERSONNEL NEEDS: AN ANNOTATED BIBLIOGRAPHY, Grover Wirick, Bureau of Hospital Administration, University of Michigan, 1966
- HOSPITAL ABSTRACTS (British), monthly
- HOSPITAL LITERATURE INDEX, quarterly, Chicago
- INDEX MEDICUS
- INTERNATIONAL ABSTRACTS OF OPERATIONS RESEARCH
- JOURNAL OF ECONOMIC ABSTRACTS, quarterly
- MANPOWER RESEARCH PROJECTS, annual, U.S. Department of Labor
- ANNOTATED BIBLIOGRAPHY OF NIH STUDIES OR PROJECTS IN SCIENTIFIC MANPOWER OR EDUCATION IN PROCESS, Semi-annual
- NURSING LITERATURE INDEX
- PSYCHOLOGICAL ABSTRACTS, bi-monthly, Washington, D.C.
- PUBLIC HEALTH ECONOMICS & MEDICAL CARE ABSTRACTS, monthly, University of Michigan
- SUMMARY OF STUDIES CONCERNING SCIENTIFIC AND TECHNICAL MANPOWER AND EDUCATION, periodic, National Science Foundation
- SURVEY OF CURRENT & RECENTLY COMPLETED RESEARCH ON HIGH LEVEL MANPOWER UTILIZATION IN THE U.S., Thomas N. Chirikos, Ohio State University, 1965

III. Organizations and Institutions Regularly Issuing Material of interest to health manpower researchers

A. Professonal Organizations

1. Health Field
   - AMERICAN DENTAL ASSOCIATION

AMERICAN HOSPITAL ASSOCIATION
AMERICAN MEDICAL ASSOCIATION
AMERICAN NURSES ASSOCIATION
AMERICAN PHYSICAL THERAPY ASSOCIATION
AMERICAN PUBLIC HEALTH ASSOCIATION
ASSOCIATION OF AMERICAN MEDICAL COLLEGES
CANADIAN DENTAL ASSOCIATION
CANADIAN NURSES ASSOCIATION
NATIONAL LEAGUE FOR NURSING
NEW YORK ACADEMY OF MEDICINE

2. Other Fields
AMERICAN ECONOMIC ASSOCIATION
WESTERN ECONOMICS ASSOCIATION
AMERICAN SOCIOLOGICAL FOUNDATION

B. Government Departments Issuing Literature

1. U.S. Government
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
DEPARTMENT OF LABOR
NATIONAL INSTITUTES OF HEALTH
PUBLIC HEALTH SERVICE
SOCIAL SECURITY ADMINISTRATION, RESEARCH & STATISTICS BRANCH

2. British
MINISTRY OF HEALTH, London
OFFICE OF HEALTH ECONOMICS, 62 Brompton Road, London

C. Institutions and Foundations Regularly Inssuing Literature

1. Health Field
HEALTH INFORMATION FOUNDATION, (Chicago)
INSTITUTION FOR ADVANCEMENT OF MEDICAL COMMUNICATION (New Yo
NATIONAL HEALTH COUNCIL (New York)
THE MEDICAL FOUNDATION (Boston)
W. K. KELLOGG FOUNDATION, (Battle Creek, Michigan)

2. Other Fields
NATIONAL BUREAU OF ECONOMIC RESEARCH
WESTERN INTERSTATE COMMISSION FOR HIGHER EDUCATION

SECTION SIX

BIBLIOGRAPHY OF SIGNIFICANT OPERATIONS RESEARCH STUDIES IN HEALTH MANPOWER

The following bibliography is made up of studies on aspects of health manpower which make use of the techniques of operations research. Included are studies which, in our opinion, make a significant contribution to the field of health manpower research. Naturally, the true test of the significance of any research is the impact it has on the development of the field and this can only be judged over time. Operations research studies on health manpower problems have all been done in recent years, and thus it may be premature to make a judgement of this kind. Therefore, a subjective judgement has been made in regard to the significance of these studies.

It should also be noted that we have not included papers which are essentially repetitive of original work. In the case of several men who have been quite productive in the area of health manpower, we have included either papers which summarize their research or theses on which further work has been based.

The papers in this bibliography fall into four general categories:

Descriptive Models - which analyze a system in such a way as to obtain a quantitative representation of the "real world" situation.

Prescriptive Models - which make possible the determination of factors necessary to achieve an optimal result, according to some prescribed objective function.

Measurement - discussing the techniques used for obtaining measurements for factors of interest.

Discussion - commenting on either the applicability of operations research methods or on other research.

Several of the papers touch on more than one subject and have, therefore, been classified in more than one category.

All the items listed here are publicly available. The annotations have been taken from Abstracts of Hospital Management Studies, which is published by the Bureau of Hospital Administration at the University of Michigan

Descriptive Models

1. Bartscht, Karl G., Grimes, Richard M., and Rothenbuhler, Ervin. "Linen Production Methods Analyzed in the Laundry", Hospitals, Vol. 40, No. 6, March 16, 1966, pp. 107-110. Available from publisher.

   Summarizes the Laundry Methodology Manual, Project Report #4 in Development of an Effective Methodology for Determining Staffing Requirements in Hospitals. The original study provides information for improving manpower budgets and staffing reports; guidelines for staff adjustments resulting from changes and for time standards for various equipment combinations; procedure to estimate future staffing needs. Detailed methods and forms for the following procedures are included: determining work-load statistics; standard man-time necessary to accomplish different laundry operations; conversion of standard man-hours to recommended staff; identifying and staffing operations requiring relief during vacation periods. Errors in data collection, differences in methods and in handling material and layout, equipment problems, workflow scheduling, skill and physical ability, set-up and replenishment time (flatwork ironer) are among the most common reasons for variance between actual man-hours and calculated standard man-hours, it is alleged. Future staffing needs can be forecast by predicting future level of demand for linen in each hospital area served.

2. Bartscht, Karl G., and Rothenbuhler, Ervin F., "Man-Minute Computations Form the Basis for New Staffing Methodology". Hospitals Vol. 40, No. 6, March 16, 1966. Available from publisher.

   This article describes the overall philosophy of the project to develop an effective methodology for determining staffing requirements in hospitals. The effect on staffing needs of demand factors and work load factors is discussed. Article concludes with a description of the steps taken in developing the methodology.

3. Bartscht, Karl G., Estrella, Manuel, and Rothenbuhler, Ervin, "Range of Required Skills Detailed in Study of the Pharmacy Function". Hospitals, Vol. 40, No. 6, March 16, 1966. Available from publisher.

   Article summarizes the authors' study on developing a methodology for staffing hospital pharmacies. Pharmacy functions are detailed and the computation of required staff time described.

4. Bartscht, Karl G., Bayha, Franklin H., and Rothenbuhler, Ervin F., "Time Analyzed for Alternative Food Flow Systems". Hospitals, Vol. 40, No. 6, March 16, 1966, pp. 88-92. Available from publisher.

   Article summarizes the authors' longer study, Development of an Effective Methodology for Determining Staffing Requirements in Hospitals, Project Report #3, Dietary Methodology Manual. This study classifies dietary operations into patient service, patron service, and ancillary activities and then subdivides them as to purpose. It provides for compiling an allocation of existing staff time corresponding to various dietary activities. Computation of workload statistics provides for collection of all workload data needed for calculation of required standard man-hours (type of data collected is listed and method described). To compute required staff dietary workload is divided into functional activities designed to furnish information concerning staff requirements for specific department tested. Variation in systems and equipment also considered. Comparison of existing and standard staffing based in existing man-hours per week versus standard man-hours per week for each operational category and associated activities. Analysis of differences between existing and standard staffing designed to isolate reasons for differences arising from methodology. Suggests specific management techniques for operation improvement. Gives approach to forecasting with analysis and procedure.

5. Fetter, Robert B. and Thompson, John D., "Patient's Waiting Time and Doctor's Idle Time in the Outpatient Setting". Health Services Research, Vol. 1, No. 1, Summer, 1966, pp. 66-90. Available from publisher.

   If outpatient care is to be made acceptable to the patient and still remain efficient, some balance between the patients' waiting time and the doctor's idle time must be achieved. Examination of the literature on the subject and of three specific waiting-time studies revealed that there are at least seven variables affecting this relationship: appointment interval, service time, patients' arrival pattern, and interruption in patient services. An outpatient department simulator was constructed so that each of these variables could be manipulated and its effect on the doctors' idle time - patients' waiting time relation assessed. Specific experiments were conducted to determine the effect of patient loads, patients' early and late arrival times, physicians' promptness, and a combination of these variables on the operation of the clinic. Results of the simulation runs are presented.

6. Iowa, State University of, Nurse Utilization Project Staff. An Investigation of the Relation Between Nursing Activity and Patient Welfare. State University of Iowa, 1960. Available from University Microfilms, Incorporated.

The validity of the opinion that increased amount or quality of nursing care produces increased patient welfare was tested by work sampling at the State University of Iowa Hospitals. Larger size ward nursing staffs and new inservice education programs aimed at improving nursing care were installed to test this theory. Also tested was the theory that nurses can sufficiently reallocate their duties themselves if the staff size is increased. The use of nursing time in wards, both before and after personnel increases, was observed, and a ward with no staffing changes was used as a control group. The staff enlargements proved to be non-productive when duty assignments were left to the responsibility of the nurses. Thus, patient welfare showed no improvement. Conclusive increases in direct patient care were not visible when the inservice education program was installed, or even when a combination of education program and larger staff was tried. Extensive development of quality measures and sampling techniques is fully detailed.

7. Jelinek, Richard C. Nursing: The Development of an Activity Model. Ph.D. thesis. Department of Industrial Engineering, University of Michigan, October, 1964. Available from University Microfilms, Incorporated.

A doctoral thesis attempting to describe the behavior of a nursing unit as it relates to the quantitative aspects of nursing care or, more specifically, to the amount of nursing time devoted to the various nursing activities. A model is developed consisting of a system of simultaneous interdependent stochastic equations which are formulated according to a number of hypothesized characteristics of the nursing unit. In the model, the endogenous or dependent variables correspond to the times devoted to three activity groups (direct patient care, indirect care, and non-productive and miscellaneous activity) by each of four nursing categories (professional staff, practical nurse staff, nurse aide staff, and student nurse staff). The exogenous or explanatory variables represent the characteristics of the patients (e.g., the general condition of the patients), the staff (e.g., the size of the staff), and the nursing unit (e.g., the type of unit).

The coefficients or parameters of the model thus formulated are estimated from "real world" data collected from six experimental nursing units in St. Joseph Mercy Hospital, Ann Arbor.

Because each equation of the system formulated in the study is but one in a system of interdependent equations (where each equation may contain more than one endogenous variable), the single equation least-squares solution does not give valid estimates of the coefficient - estimates obtained by this method have been shown to be biased and inconsistent. Thus, an alternative procedure is necessary for estimating the coefficients of the system. This study contains a comparative discussion of several such alternative estimating procedures. The method of limited-information maximum-likelihood estimation is selected.

The author feels the model: 1. shows that the quantitative aspects of nursing care are highly related to various predetermined and measurable characteristics of the unit and thus are predictable. 2. indicates that, in general, added increments in the size of the nursing staff yield progressively lesser increments in the time devoted to direct patient care. 3. reveals the existence of the substitution effects between the various nursing categories (as well as providing a measure of the magnitude of these effects). These are the effects attributed to change in staff level of nursing category on the time devoted to the nursing activities by another nursing category.

Possible applications of the methodology developed in the study to general nursing research and to the individual hospital's evaluation of its nursing service are discussed in the concluding chapter.

8. Nadler, Gerald and Kancharla, G., Progress Functions and Stochastic Models for New Activities in Hospitals. Reprinted from Work Study and Management, August, 1964. Available from Dotesios (Printers) Ltd., Bradford-on-Avon, Wiltshire, G.B.

   Report suggests that learning curves (progress functions), may have application in hospitals for time predictions, manpower requirements, cost estimation, and cost control. It was hypothesized that time/unit output produced from a new hospital procedure follows a progress function and that if a progress function fails to predict unit times/output time significantly better than the mean time of the accumulated data, then the unit times form a Pearsonian type III frequency distribution. Two new surgery procedures introduced at Jewish Hospital, St. Louis, three and four years ago respectively were used to test the hypotheses. The recorded times did not exhibit distribution. Each of the operations had its own pattern of variation indicating that better scheduling can be obtained (i.e., schedule operations with greater time variation near the end of the day). It was concluded that the skill of the surgeons over-shadowed any learning in these procedures, but that other procedures in the hospital not involving activities dealing directly with the patient should be tested for the progress function concept.

9. Robinson, Edward P. "Determining Nursing Staffing Patterns for an Intensive Care Unit". Hospital Topics Oct., Nov., Dec., 1960. 30 W. Washington, Chicago 2, Illinois. Available from publisher.

   The pilot study used to obtain the necessary information and data and the literature on care patterns is explained and described. Terms are extensively defined. The work-sampling technique is used for analysis and a rather extensive discussion of work sampling theory is given. The author's own application of the work-sampling is discussed. A step-by-step procedure for analyzing the work sample is included. The 1959 study data were taken in five categories of direct, indirect, miscellaneous, delay, and "reassignment". Staffing patterns are given for a unit averaging about 11 hours per patient days of care.

10. Young, John P. A Method for Allocation of Nursing Personnel to Meet Inpatient Care Needs, Operations Research Division, Johns Hopkins Hospital, October, 1962. Available from University Microfilms, Incorporated.

    A short summary of the Connors system to classify patients by "care needed" and an associated staffing method to meet peak demands is presented. The original study, using data for 96 patients collected by bedside observers, and nursing work sampling is reviewed. Sample forms and calculations are shown, illustrating the procedures for a hospital using the staffing method.

Prescriptive Models

1. Ortiz, C. Jorge de Jesus. Some Linear Statistical Models for the Selection of Medical Students. Operations Research Division, The Johns Hopkins Hospital, 1964. Available from University Microfilms, Incorporated.

    The purpose of the study was to identify factors to be considered for prediction of academic performance and then develop a mathematical model. Data were obtained from the admissions records of Johns Hopkins University 1959-62. Students accepted by the University and who attended Johns Hopkins became the data source for developing the equation while those who applied and went elsewhere were used to check the model. Pre-medical schools were classified and the variation among them was reduced to one variable, a linear combination of four criteria: the average scores of the applicants from each of the 150 pre-medical schools on the four subtests of the MCAT. Regression and discrimination analysis produced linear models for selecting medical students based on variables of past achievement. The techniques were combined, providing a greater degree of suitability than either method by itself. Finally, the linear model was compared with the old committee decision system of acceptance and found to communicate more information about the state of nature of the applicant.

2. Wolfe, Harvey. A Multiple Assignment Model for Staffing Nursing Units, Operations Research Division, The Johns Hopkins Hospital, Available from University Microfilms, Incorporated.

    Approaches nurse staffing from linear programming formulation. "Multiple Assignment Model" takes into account both quantitative and qualitative aspects in arriving at an optimal solution, provides decision rules for assigning various classifications of personnel effectively to units. Considers qualitative aspects by constructing cost coefficients of nurses and administrators as necessary qualifications for different sets of activity. These coefficients are measures of effectiveness of various staff assignments. The solution minimizes cost of personnel allocation. The model will provide a solution regardless of the variance in the qualitative assumptions. Study also leads to development of a qualitative rating scale that has as its attribute the qualitative aspects of performing nursing care. Attribute underlies preferences of nurses and administrators for assigning activities to personnel. Study also substantiated certain results of Connor's thesis and extended others. The author feels he cannot effectively compare results of thesis until quality of care can be determined. Study present technique for obtaining single measure of quality of care in anticipation of the need. Establishes factors needing to be measured and a method for combining the measures. Measures have not been determined.

3. Wolfe, Harvey, Optimal Length of Training for a Female Nursing Aide, Operations Research Division, The Johns Hopkins Hospital, Available from University Microfilms, Incorporated.

   Study to determine the optimal length of training program, based upon turnover and established training methods. A general theory is developed relating length of training to length of stay. Calculation of optimal length of training for any estimated length of stay. Length-of-stay distributions approximated by gamma distribution. Capability curve showed relationship between per cent of standard skills attained and length of training. Results indicated that five-week training period is preferable at Hopkins when the expected length of stay is short. If length of stay were to increase, then a six-week training would be most profitable, since the study indicated that maximal learning occurs after six weeks, with no additional increase in capabilities after the sixth week of training. Required skills listed, with unit costs, rating sheets, frequency of duties, and other data.

4. Wolfe, Harvey and Young, John P., "Staffing the Nursing Unit - Part I: Controlled Variable Staffing; Part II: The Multiple Assignment Technique, Part I - Nursing Research, 1965, Vol. 14, No. 3, pp. 244-253. Part II - Nursing Research, Vol. 14, No. 4, 1965, pp.299-303. Available from Publisher.

   PART I: Formulates method of predicting nursing load and allocating staff based on research study done at Johns Hopkins Hospital. A Direct Care Index, using a classification of patient needs rather than patient census, is computed daily. Total load predicted by adding Index computation to other demands of nursing unit which have been indicated by work sampling survey. Procedure of Controlled Variable Staffing based on fixed staff needs with supplementary staff assigned according to load predictions.

PART II: Multiple assignment technique of staff allocation views nursing units as a system of tasks to be accomplished at various skill levels to reflect both qualitative and quantative staffing needs. Describes procedures in different job categories and shows multiple assignment model drawn up for Johns Hopkins Hospital with both time requirement and cost value determined. Data programmed by computer for daily optimal staffing pattern.

MEASUREMENT

1. Connor, Robert J., "A Work Sampling Study of Variations in Nursing Work Load", Hospitals, Vol. 35, No. 9, May, 1961. Available from Publisher.

   This article reports on a work sampling study conducted to investigate causes for variations in the Direct Care Index. The index is an accurate measure of the amount of direct patient care that is given on a nursing unit by the nursing personnel. Among the findings reported is that as nursing hours available increase, there is no increase in direct patient care but instead an increase in personal time.

2. Flagle, Charles D., Measures of Effectiveness for Selection, Training and Motivation of Hospital Personnel, Presented at the Session on Operations Research in Hospitals, Fifth Annual Meeting of the Operations Research Society of America, Philadelphia, May 10, 1957

   As part of studies on employee turnover in hospitals, the Operations Research Department at Johns Hopkins Hospital has studied the distribution of employment duration among auxiliary personnel. This distribution is useful for the information it contributes in determining the cost of training personnel and for the information it may contain on the effectiveness of selecting and retaining staff as the nature of the work is changed.
   The author presents three models of turnover which are based on an analogy of troop casualties in battle. Evidence suggests that the model in which the population is essentially homogeneous but the hazards of the environment vary with experience is the most realistic. In this case the attrition rate is highest in the first six months, but remains high (40%) in the following period and seems to remain constant out to 5-7 years. Assuming that early loss is a failure in either selection, training, or motivation of employees then the initial attrition rate and the time to transition to a lower rate can be used as measures of the effectiveness of personnel functions.

3. Nadler, Gerald and Kancharla, G., "Progress Functions and Stochastic Models for new Activities in Hospitals", Reprinted from Work Study and Management, August, 1964. Available from Dotesios (Printing) Ltd., Bradford-on-Avon, Wiltshire, Great Britain

   For annotation see section on "descriptive models."

4. Bartsch, Karl G., Grimes, Richard M., and Rothenbuhler, Ervin, "Linen Production Methods Analyzed in the Laundry", Hospitals, Vol. 40, No. 6, March 16, 1966, pp. 107-110. Available from publisher

For annotation see section on "descriptive models".

5. Bartscht, Karl G., and Rothenbuhler, Ervin F., "Man-Minute Computations Form the Basis for New Staffing Methodology", Hospitals, Vol. 40, March 16, 1966. Available from publisher

For annotation see section on "descriptive models".

6. Bartscht, Karl G., Estrella, Manuel, and Rothenbuhler, Ervin F., "Range of Required Skills Detailed in Study of the Pharmacy Function", Hospitals, Vol. 40, March 16, 1966.

For annotation see section on "descriptive models".

7. Bartscht, Karl G., Bayha, Franklin H., and Rothenbuhler, Ervin F., "Time Analyzed for Alternative Food Flow Systems", Hospitals Vol. 40, No. 6, March 16, 1966, pp. 88-92. Available from publisher

For annotation see section on "descriptive models".

8. Iowa, State University of, Nurse Utilization Project Staff, An Investigation of the Relation Between Nursing Activity and Patient Welfare, State University of Iowa, 1960. Available from University Microfilms, Inc.

For annotation see section on "descriptive models".

9. Ortiz, C. Jorge de Jesus, Some Linear Statistical Models for the Selection of Medical Students, Operations Research Division, The Johns Hopkins Hospital, 1964, Available from University Microfilms, Inc.

For annotation see section on "prescriptive models".

10. Robinson, Edward P., "Determining Nursing Staffing Patterns for an Intensive Care Unit", Hospital Topics, Oct., Nov., Dec., 1960, 30 W. Washington, Chicago 2, Illinois. Available from publisher.

For annotation see section on "descriptive models".

11. U.S. Public Health Service, How to Study Nursing Activities in a Patient Unit - A Manual to Aid Hospitals in Making Use of Personnel, U.S. Department of HEW, P.H.S., Div. of Nursing, Washington, D.C. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

Revised edition of the Public Health Service methodology for nursing work sampling. Expands coding and revised skill level classes. Appendices include blank tear-out forms for analysis and presentation of results.

12. Wolfe, Harvey and Young, John P., Staffing the Nursing Unit - Part I: Controlled Variable Staffing; Part II: The Multiple Assignment Technique, etc.

For annotation see section on "prescriptive models".

13. Young, John P., A Method for Allocation of Nursing Personnel to Meet Inpatient Care Needs, etc.

For Annotation see section on "descriptive models."

DISCUSSION

1. Flagle, Charles D., "Operations Research in a Hospital", Flagle, William Huggins, and Robert Roy (eds.), Operations Research and Systems Engineering, Baltimore: The Johns Hopkins Press, 1960, Chapter 25

Describes the applications of operations research to the activities of the hospital, using Johns Hopkins Hospital as an example. Three problems of providing inpatient care - scheduling of staff, economic balance, and personnel turnover - are discussed and a fourfold attack on the problems is given. In order to determine the optimal system of staff, facilities, and procedures, and thus solve the problems, it is necessary to evaluate procedures and advanced equipment, to analyze random or unpredictable demand, to systematize the activity pattern, and to reduce auxiliary personnel turnover.

The systems approach has been successfully tested in one experimental inpatient unit and it is anticipated that the approach will prove even more effective when it is applied to the entire hospital since "the only systems or changes worth instituting have proved to be those which are incompatible with the concept of the ward as a self-sufficient entity."

How queueing theory aids in the analysis of the outpatient care system is also described.

The author calls for a greater role for operations research in the provision of health care, involving not only administrative aspects but professional as well.

2. James, Irene, et. al. "Operational research in nursing: 1. Nursing research and patient title care; 2. Measuring nursing care; 3. Some practical results of recording nursing care in gynaecological wards; 4. Applied research for the nurse-administrators; 5. Reflections on the reasons for and the implications of nursing research." in Problems and Progress in Medical Care, Gordon McLauchlan (ed.), Oxford University Press for Nuffield Provincial Hospitals Trust, 1964. Available from publisher.

Contains five different however related articles. "Nursing, Research and Patient Care" describes work of research group of nurses, doctors and statisticians in studying items of nursing care given patients in medicine, surgery, gynaecology and chest diseases. Gives short description of nurses' place in research and the potential use of recording nursing care and its impact and impetus. "Measuring Nursing Care" describes method of measuring nursing care combining minimum amount of work on part of ward staff with maximum amount of information about patients undergoing treatment. Describes procedure of classifying patients into care groups to obtain a work-load index.

Illustrates results of measurement used. "Some Practical Results of Recording Nursing Care in Gynaecological Wards" a systematic recording of nursing care has led to expedition of treatment. Describes previous conditions, survey, results for selected diagnoses and net effect. "Applied Research for the Nurse-Administrators" studies care group concept of nursing and its part in management of ward. Consideration is given to type of measurements devised and how they can be manipulated to represent work-load of a ward. Possible applications include shorter hospital stay, allocation of staff and patients, ward size and bed allocation, and prediction of workload. "Reflections on the Reasons for and the Implications of Nursing Research" discusses problem of number of nurses to be employed.

3. Horvath, William J., "British Experience with Operations Research in the Health Services", Journal of Chronic Diseases, Vol. 17, No. 9, pp. 779-788, New York, Pergamon Press, Sept. 1964. Available from publisher.

Informal report of a visit to Great Britain, describing work done at leading centers there. Edinburgh, Oxford, and the Ministry of Health were visited. The author discusses the slow growth of operations research in both U.S. and Great Britain, and points out problems in the need for revising data collection mechanism in hospitals, the lack of qualified personnel for research, and, particularly, in the U.S., the lack of access to home-and-office care data.